# THE AUTOMOBILE

WEEKLY — NEW YORK—THURSDAY, MARCH 28, 1907—CHICAGO — 10 CENTS

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**PRODUCT**

Our name has been a guarantee to dealer and consumer alike that honest quality and skilled workmanship would be found in most perfect combination in every product bearing the GRAY & DAVIS name.

That reputation is worth more to us than the price of many lamps and it becomes to you and to every user of our goods an unquestioned, unchanging guarantee of satisfaction.

**GRAY & DAVIS**
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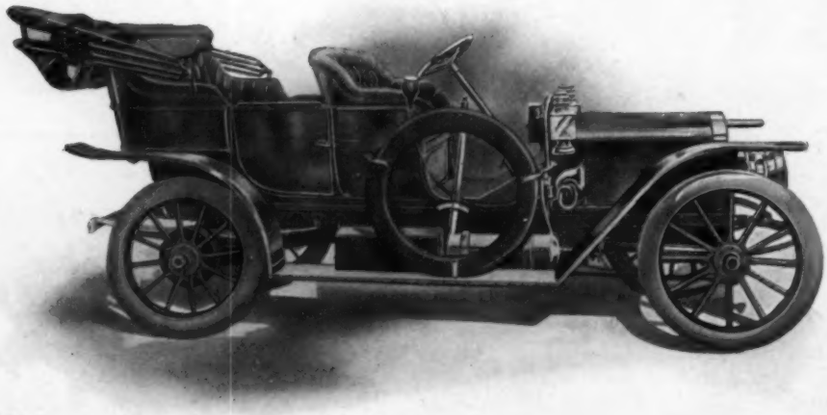
# CORBIN

**See the "full-jeweled" Corbin before deciding.**
**Distinctly the best $2,500 value in the market.**



**CORBIN MOTOR VEHICLE CORPORATION, New Britain, Conn.**

Member Association Licensed Automobile Manufacturers

CORBIN MOTOR VEHICLE CORPORATION of New York, 1779 Broadway

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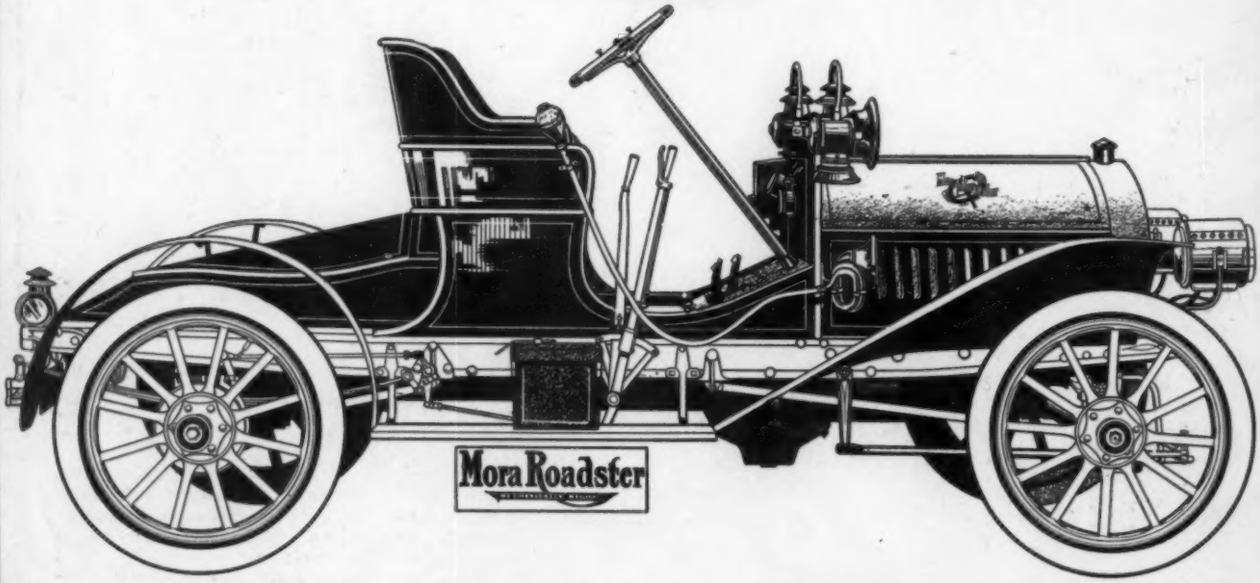
THE IDEAL GENTLEMAN'S CAR

# Mora Roadster

MECHANICALLY RIGHT

1907 MODEL B, ABSOLUTELY MUD PROOF




**Specifications**—Four cylinder vertical Engine, 24 horse power, water cooled. 98-inch wheel base; 32-inch wheels. Weight 1700 pounds. Entirely mudproof. Price $1800. Surrey seat $125 additional.

**MORA MOTOR CAR CO., 318 Livingston Building, ROCHESTER, NEW YORK**

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# THE AUTOMOBILE

IT may be that some day in the near future the meaning of the "A.B." degree will be changed from Bachelor of Arts to Bachelor of Automobiling. Cornell University in the past two years has introduced into its curriculum a practical course on automobile construction, which is practical in every sense of the word, so much so that the work is made extremely interesting as well as instructive. Professor Rolla C. Carpenter is the head of the Department of Experimental Engineering and a recognized authority on mechanical matters, and incidentally is the consulting engineer of a widely known company making steam automobiles. Cornell's automobile course consists of two lectures a week, given throughout the second half of the year, and every detail of the modern automobile is discussed.

### The Course is Most Thorough and Complete.

The history of each part is thoroughly gone into, and the improvement in design, from its inception to present-day perfection, is carefully studied. The same method is pursued with the unsuccessful or discarded attachments, the reasons for their failure carefully investigated, and the young designer forewarned against "freak" innovations which have threatened to "revolutionize the motor industry." Of course, incentive for original research and design is given, but in such a way that it will lead through channels where the greatest good can be accomplished without going over the ground already trodden by unsuccessful attempts.

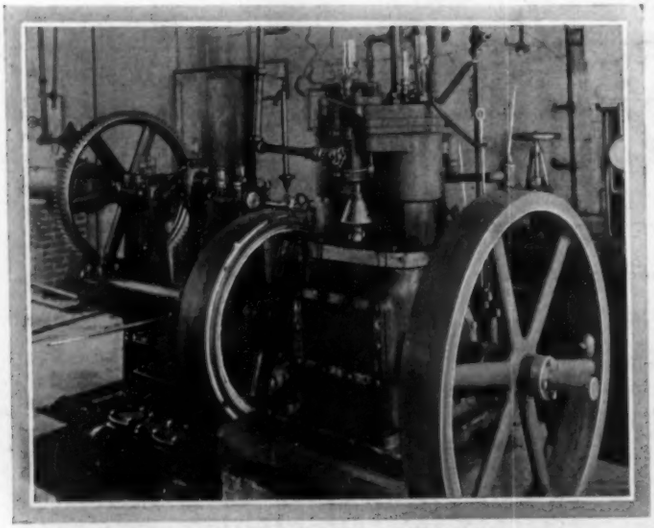
After all of these parts are investigated in detail, the assembled chassis as a whole is studied, the best materials to be used for frame, gears, shafts, etc., is determined, and then the student is ready for investigation in the construction of the leading makes of cars, both foreign and American. This study is greatly facilitated by the use of stereopticon views, which consist of several pictures of the make under consideration, showing the car as a whole, the chassis and any feature peculiar to that make.

Another course in the university which may well be taken in conjunction with the course above mentioned is a series of lectures in gas engine design, or "internal-combustion motors," as it is officially called. This is given by Professor Herman Diederichs, who is unusually well equipped to give a course on this subject, having made a study of the gas engine from both a theoretical and practical point of view. Professor Diederichs is a collaborator with Professor Carpenter in an exhaustive treatise on the internal combustion motor, now in the press. As its name indicates, this course of lectures, of which there are two a week during one term, devotes itself exclusively to the study of the gas engine, and includes the stationary and marine, as well as the automobile types.

While this is not entirely a theoretical course, formulæ for the design of all parts of a motor are not only learned, but derived as well, and standard measurements and proportions as adopted by the leading makers are discussed and investigated. It is in this course that the student can realize what the automobile has done toward the development of the internal combustion motor, how the weights of the materials used have been reduced, the qualities of the metals improved, the entire machine simplified by the elimination of unnecessary parts, and the increase in accessibility.

Not the least valuable part of this course is the study which is made of the theory of combustion, and the chemical changes which take place in the cylinder of a gas motor. This naturally leads to an investigation of the efficiency of the various fuels, and tables and data are given showing the performance of motors using every kind, from ether to alcohol, and from crude oil to kerosene. Particular attention has been paid to the use of alcohol as a fuel, especially since the free alcohol bill was passed.

Another interesting phase of these lectures is the theoretical investigation of the comparative efficiencies of the two and four-cycle engines for all kinds and sizes of work, from the small motor-cycle engine to the mammoth power-plant engines as used

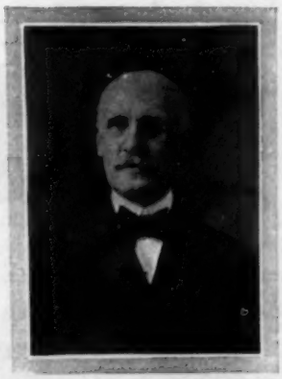


TWO-CYLINDER WESTINGHOUSE RIGGED FOR TESTING.
The pump shown at the left of the engine is used as a dynamometer, the amount of water pumped in a given time being found, and this reduced to the horsepower that the engine develops.

to a great extent in Germany. Taken all in all, this course, if entirely mastered, would give the student a keener insight into modern practical gas engine building than months of study of the best books and investigations at the different shops.

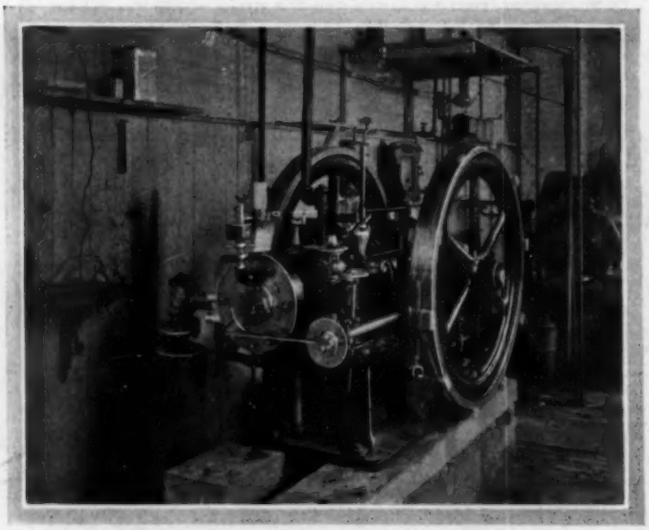
The foregoing courses, it will be noticed, consist mainly of lectures, where the student absorbs, as it were, the information gleaned by others without putting his knowledge to any practical use. In the course on "Gas Engine Design," however, which is given under the direction of the Machine Design department, opportunity is found for the application of all the knowledge available on the subject, for the student here designs a practical engine. The size and purpose of the motor are first determined, and then, applying the formulæ and methods of design learned in the lectures, the student makes working drawings of the complete gas engine, including every detail of dimensions, kind of material to be used, and finish. These drawings are required to be so complete that they could be sent to a foundry and a practical engine turned out from these specifications.

While, of course, modern practice and conventions are followed to a great extent, there is opportunity given the student to exercise his own ingenuity in original design, and possibly the solution of many of the problems which now confront the gas engine builder may be unexpectedly discovered in this drawing room. Now for the practical side of the course—for no investigation would be complete without the experimental proofs of the deductions and conclusions reached from the theoretical study. This is found in the Mechanical Laboratory, which is the most complete of its kind of any technical school in the country. The leading makes of two and four-cycle engines are here tested under different conditions of load, speed, fuel and the like, and the most efficient speed and load at which each model should be run is thereby determined. This testing of gas engines is included in the regular course of testing all kinds of machinery, and is required of all engineering students, be they mechanical, electrical or marine. These tests last throughout the Junior and Senior years, and each student is required to complete one a week. This course is extremely interesting, and is merely an application of the methods learned in the class rooms as a means for teaching original investigation and arriving at practical results.



PROF. ALBERT W. SMITH,
Director of Sibley College.

It might be interesting to note that one of the first gas engines to be used in this country is on exhibition in this laboratory, and the contrast between this cumbersome machine and the light, four-cylinder automobile engine near which it is placed is striking. This parent of the modern automobile power plant consists of a single vertical cylinder, which is inverted—that is, the explosion forces the piston up instead of down. This piston is very heavy and has a connecting rod which consists of a rack or heavy rod, with gear teeth cut in it transversely. These teeth mesh on the down stroke with teeth cut in the shaft of a heavy flywheel. When the explosion takes place, the piston and rack are forced up, and when the exhaust has occurred the weight of the moving parts provides the force which revolves the flywheel by means of the rack meshing in with the gear only on the down stroke. It will be seen that the explosions are utilized only to move the weights up to a position where they can perform their work, and that not only must the speed of the engine be necessarily slow, but the power of the engine small, considering its weight and size.

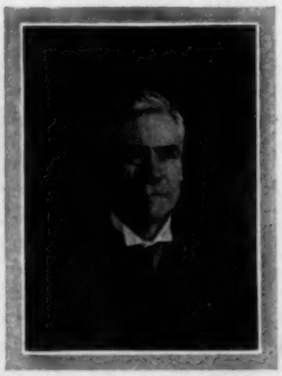


OHIO GAS ENGINE RIGGED FOR TESTING.
Showing dynamometer on flywheel and apparatus for obtaining indicator cards

### Ithaca Has Many Autos and Much Enthusiasm.

One familiar with the locality would hardly consider the central part of New York State an ideal place for automobiling. And it isn't—steep hills are as frequent as good roads are scarce. By the central part of the State is not meant the vicinities of the larger cities such as Syracuse, Utica and Rome, but more what is known as the lake region. Here is to be found some of the most beautiful scenery in all of the Eastern States, and it is this combination of hill and valley, ravine and lake that makes the hills and roads what they are—and aren't.

Notwithstanding its location in the heart of this region, at the head of the Cayuga Lake, Ithaca can boast of as many automobiles and as many auto enthusiasts as any city of its size in the State, and possesses an automobile club which has done much to popularize both automobiling



PROF. ROLLA C. CARPENTER,
Head of Department of Experimental Engineering, Sibley College.

and motor boating. But the heart and source of this interest lies "On the Hill"—in fact, the heart of Ithaca lies on the hill—for it is with the faculty and students of Cornell University that much of this interest centers. In fact, practical automobile construction and design are taught there. To be sure, no chauffeur's degree is conferred, but many of the recent graduates bearing the M.E. degree know more about gasoline motors and motor boats than they know about steam engines or calculus.

## MR. WINKLEY'S IDEA.

Recently, before the Ad Men's Club of Boston, Robert L. Winkley, manager of publicity of the Pope Manufacturing Company, said in the course of an address:

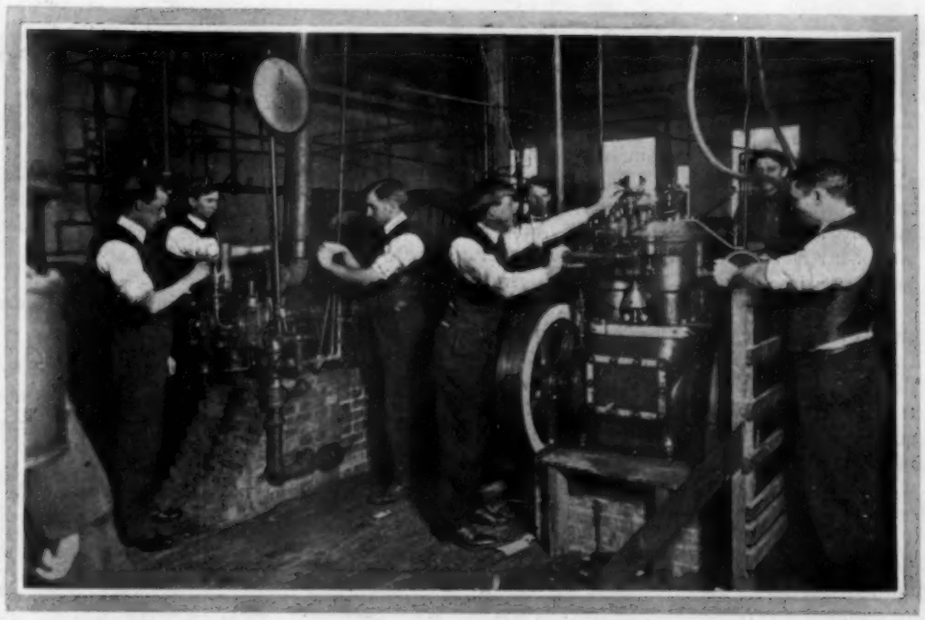
"There is no kind of publicity, whether it be direct or indirect advertising, so valuable as that which comes by word of mouth. The friendly comment and advice of a satisfied customer is far reaching and of great value. I believe that the trade papers do more to stimulate that word-of-mouth publicity than any other line of publications, because they go directly to the salesman, dealers and buyers throughout the country, and they act as a sort of medium of communication between these people, and what they have to say and do in the trade is an important element in shaping the conditions of the trade."

## IMPORTERS' SHOW NOW REGARDED AS CERTAIN.

The announcement of the Association of Licensed Automobile Manufacturers that it will hold its show in November instead of January has roused the importers of foreign cars to action, and they are united in their declaration that an exhibition of imported cars at a later date will be a necessity. The sentiment as generally expressed in New York City is in favor of a show for foreign cars of all makes, whether sold here under the Selden patent license or not, though several importers express their strict loyalty to the A. L. A. M. and state that licensed and unlicensed imports should be kept separate.

One of the leading importers of licensed cars made the following statement: "It will be a physical impossibility to have 1908 models of foreign cars here by November, or even by December. There are eight importers of twelve makes of cars in the licensed group and they could make a fair show by themselves. But if all the importers got together a representation of from forty-five to fifty makes of foreign cars could be displayed. It is a question whether the A. L. A. M. would consent to the use of the Garden if unlicensed cars were to be shown there, but probable that that privilege will be sought."

At a meeting of the Importers' Automobile Salon to-night this matter will be discussed.



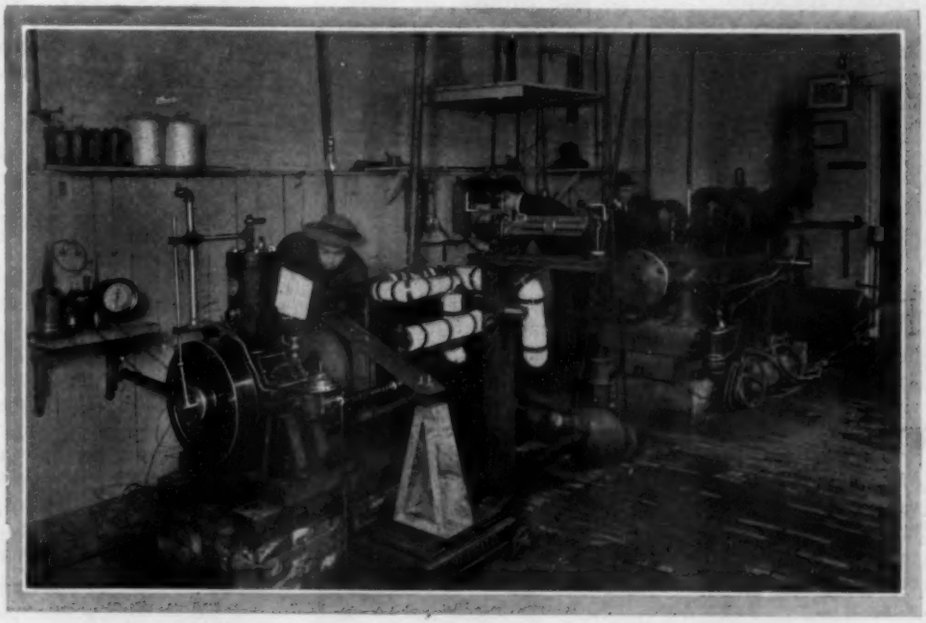
AT WORK IN THE MECHANICAL LABORATORY, SIBLEY COLLEGE, CORNELL UNIVERSITY.

Testing a Westinghouse gas engine on the right, and experimenting with one of the early forms of gas engines at the left. Students engaged in their daily practical work.

## GAS ENGINES FOR BRITISH WARSHIPS.

LONDON, March 18.—The shipbuilding and gunmaking firm of Vickers Sons & Maxim, after three years' continuous research, has perfected a system of propelling war ships by means of internal combustion engines. A vessel of this type has been designed, which, having no boilers and no smoke stacks, will have enormous advantages over existing battleships. Her dimensions are moderate, but she is speedier than existing ships. Her battery is more powerful than that of the Dreadnought class, since, owing to the absence of smoke stacks, all ten guns can be fired on either beam and six of them ahead or astern.

A paper recently read before the Institution of Naval Architects predicted that warships in the future would be propelled by gas engines instead of steam. British naval authorities are now considering the adoption of motor boats on warships.



LOZIER MARINE ENGINE RIGGED FOR TESTING, IN SIBLEY COLLEGE LABORATORY.

# EARLIER DATES FOR GARDEN AND COLISEUM

THE 1908 product of the American automobile manufacturers will be on view, both in New York and in Chicago, before the close of the present year. The Madison Square Garden show of the Association of Licensed Automobile Manufacturers will be held from October 31 to November 7, and the exhibition of the National Association of Automobile Manufacturers will take place in Chicago from November 30 to December 7.

It would appear that the latter date would conflict with the show of the Automobile Club of America, supported for the past two years by the American Motor Car Manufacturers' Association, and for which dates have been reserved in the Grand Central Palace from November 30 to December 7. It is probable and possible that the A. C. A. may advance its dates in view of the move of the A. L. A. M., and it is understood that the A. M. C. M. A. has prepared itself for any revision of the show situation. Alfred Reeves, its general manager, is expected back from a Western trip to-day, and a conference of the A. C. A. Show Committee is expected to follow. There has been some talk that the anti-Seldenites might promote an outdoor exhibition in November, but apparently this has never progressed beyond the mere suggestion.

**How the A. L. A. M. Show Announcement Reads.**

From E. H. Cutler, chairman of the Executive Committee of the A. L. A. M., on Monday came the following announcement:

"At the last meeting of the Board of Managers of the Association it was unanimously agreed to have an early show if suitable dates could be arranged. The Licensed Association has an option on Madison Square Garden for automobile shows for two years, and it was only a question of an arrangement of dates to proceed for an early show. Negotiations were completed on Saturday, and arrangements made for October 31 to November 7.

"The success of the last show in the Garden, where the attendance was so great that it was necessary to increase the admission for two days to $1, **has suggested the possibility of a ten-day show.** The advisability of this is still under consideration by the Association.

"The show situation has so materially changed in recent years that an early show seems advisable. The demand for early deliveries of standard cars has been in part responsible for the Association of Licensed Automobile Manufacturers' change to early show dates. For years the tendency of automobile shows has been to particularly interest the dealers, but now that the industry has settled on a firm and conservative basis, contracts for the year's output of the various factories are usually made long before the end of the year; in fact, most of the cars for the following year are tried out long before November and December. The standard time which various manufacturers would naturally consider the best time for the showing of the following year's models would be based on a standpoint of knowing early enough what the people desired in the way of special specifications. Early shows would give ample time for purchasers to get in specifications, so that the factories would not be taxed to the limit of their capacity in getting out cars for delivery the early part of the spring."

**Explaining the Whyfore of Earlier Chicago Dates.**

From S. A. Miles, general manager of the N. A. A. M. and also manager of the Chicago show, comes the following pronunciamento:

"The Eighth Annual National Automobile show at Chicago will be held at the Coliseum and First Regiment Armory, November 30 to December 7, as usual under the auspices of the National Association of Automobile Manufacturers, Inc. As was the case in February, the Chicago show will be the only truly national event of the year, for it will be the only one which will bring together all makes of cars, regardless of the affiliations of their makers with any other association.

"The early date has been selected only after careful consideration. There are a great many people in the trade who still believe that February, or even a later date, is the proper time for the show, but the expression of a desire for an early date has been so general that it has been deemed fair to early show advocates to give it a trial. The New York shows are to be held late in October or early in November, so that there will be the usual interval between New York and Chicago. The request made by the Chicago Automobile Dealers' Association was also an important factor in determining the date.

"It is probable that the allotment of space will be made about the first of September, though an earlier date may be selected."

**May Embarrass the Foreign Makers.**

Earlier dates for the New York and Chicago shows may seriously embarrass the foreign makers, for it will compel them to turn out a double set of models in order to exhibit their up-to-date machines in this country. The Paris Salon has already contracted for November dates and will continue for twenty days and lap into December. London's show is even earlier. Exactly how the foreign makers will meet the situation is somewhat problematical, but it is a certainty that they will contrive in some manner to figure in the American shows, for the market in this country is too valuable to be sacrificed without a big effort.

# EUROPEAN MAKERS ARE UNITED ON SHOW DATES

REGULARLY every year, with the single exception of 1898, when the show was held in the month of June, Paris has held its automobile salon early in December. Once, in the early days, the unanimity of the constructors was destroyed and two rival shows were opened. For ten years, however, all has worked harmoniously, the Automobile Club of France organizing an annual show with the double object of exposing the latest models of automobiles and of impressing the public with the value of the new means of locomotion. It is this latter policy which has done so much to make the show the important demonstration it is to-day. It has been lifted above the level of a trade organization and made a public demonstration that no up-to-date person dare admit he has not seen. Other countries have either not grasped the value of this line of procedure or have been unable to carry it out on account of local circumstances.

From December 8 or 9 to December 23 or 24 has been mutually and unanimously agreed upon as the most suitable date for the holding of the Paris show, and not even the proposition of a change would have been thought of had not the London show authorities, out of commercial rivalry, attempted to get ahead and transfer the world's market to the other side of the Channel. London, which up to 1895 had held its annual automobile exhibition after that of Paris, advanced its date to November with the avowed purpose of making French constructors show their new models in England before they were exhibited in Paris. The move succeeded to a certain extent, for unwilling to be behind on such an important market as is Great Britain, French

makers put forth a special effort and finished some of their following year's models in time to be exposed at the earlier show. Contrary to what had been expected, however, the French club did not respond to the British challenge by altering the date of its show; the announcement that this year's Paris salon will open in November instead of December is due entirely to the fact that it is the decennial show and will be celebrated with increased éclat.

French constructors are almost unanimously of opinion that it is impossible to produce the following year's models conveniently before the end of November or beginning of December. All European factories, for instance, are now working on their 1907 output and will continue to be busily employed thereon until early August. The selling season then being practically over, attention can be paid to the designing and construction of new types for 1908. Four months in which to design, construct, try out and give a show finish to two or three new models is not too long a period for even the best equipped factories. This is proved by the fact that the French makers are never ready for the show until a few days before the doors are thrown open. If the annual exhibition were held later there would not be sufficient time for agents to make sales and for the factory to fulfil orders early enough in the touring season to satisfy the public. From the standpoint of the salesman London's move in holding the show in the middle of November was commendable; but the same qualification cannot be applied when the constructors' interests are considered. In the last analysis it is best for all concerned that new models should be thought out when the factory is least occupied with pressing work. That period is at the end of the summer, and as a consequence the time of year for bringing out the new finished production is as late as possible in the year as is compatible with deliveries in time for the following season. There is nothing to be gained by holding an automobile show earlier than the beginning of December and French manufacturers are fully aware of it.

## REPORT OF THE YEAR'S WORK AT HARTFORD.

During the past twelve months the Hartford laboratory of the mechanical branch of the Licensed Association of Automobile Manufacturers has been busily engaged in experimenting along various lines, and has just issued a report of the results of its work to the members of the association. Materials have chiefly occupied attention, and during the year scores of samples of special steels of various grades have been tested in various ways to ascertain the best method of bringing about the toughest possible condition of the metal. Among the alloy steels experimented with were nickel, chromium, chrome-nickel, silico-manganese and vanadium, particular attention being given to the latter. Some of the members of the association have been using vanadium steels in their cars, but the experiments having proven the great desirability of its extended use in the making of certain parts, the association has recommended its universal adoption by the members, as it is considered to be more serviceable than any other metal known. Specifications for the treatment of metals, screw material, cast iron, steel and nickel castings, with directions for obtaining the best results, have been issued in connection with the report. Not long ago the entire mechanical branch spent the day at the Bethlehem Steel Works inspecting the methods employed.

Among other things recommended in the report as the result of investigation during the past year are the adoption of a standard form of magneto base and a standard drill size, as there was found to be considerable variance in the use of taps and drills. A new feature about to be established will be the Technical Library of the Mechanical Branch, which will be installed at the association rooms under the supervision of the secretary, Coker F. Clarkson. As the first and only library of its kind, every effort will be used to make it as complete as possible, experiments, tests and formulæ emanating from the association laboratory at Hartford and from those of the makers being carefully tabulated.

## PREPARING FOR THE MONTREAL SHOW.

MONTREAL, March 25.—R. M. Jaffray, director of the Montreal Automobile and Sportsman's Show, which will open at the Arena April 6, is a mighty busy man these days preparing for what promises to be the most notable automobile event ever held in Canada. While at the Boston show Mr. Jaffray obtained some new ideas, which will be utilized in the conduct of the local exhibition. The new annex is nearing completion, and the Arena will be tastefully decorated for the occasion.

One of the most interesting features of the automobile business in Montreal is the double expenditure necessitated by advertising in newspapers of two languages, English and French, caused by the large French speaking population.

## SOME PITTSBURG SHOW PRELIMINARIES.

PITTSBURG, PA., March 25.—The Automobile Dealers' Association has invited the Mayors of Pittsburg and Allegheny to open formally the first automobile show in this city, beginning April 8. Governor Stuart and Lieutenant-Governor Murphy have also been invited to attend. The clubs of the Pennsylvania Motor Federation have been asked to send representatives and a meeting of this body will take place during the show.

DUQUESNE GARDEN, WHERE PITTSBURG WILL HOLD ITS SHOW.

The Liberty Automobile Company has completed arrangements for a thousand-mile non-stop run by a Wayne car. The run will begin April 4 and it is expected that a thousand miles will have been covered by the time the show opens. The car will then enter the Duquesne Garden and its motor will continue to run until it stops of its own accord. Various features will be employed in calling attention to the performance, including a guessing contest as to the distance covered every six hours and the time the motor will continue to run in the Garden.

Despite the fact that the Motor and Accessory Manufacturers declined to grant a sanction for the show, there will be a substantial line of accessories, including several displays of tires. The Show Committee, consisting of Thomas I. Cochran, W. H. LaFountain, Earl Kiser, W. N. Murray and Robert J. Sample, are sparing no expense in the work of preparation, and the Garden will be decorated in white and green, and 10,000 electric lights will add to the splendor of the affair.

The following dealers will exhibit: American Automobile Co., Allegheny Automobile Co., Atlas Automobile Co., Auto Repair Co., Banker Bros. Co., Colonial Automobile Co., D. P. Collins, Central Automobile Co., East Liberty Automobile Co., Forest City Automobile Co., Fort Pitt Automobile Co., Hiland Automobile Co., Homewood Automobile Co,, Iames Motor Co., Keystone Automobile Co., Liberty Automobile Co., E. Nevin, J. E. McNary Co., Pennsylvania Automobile Co., Pittsburg Motor Vehicle Co., Rainier Automobile Co., Standard Automobile Co., Union Automobile Co., Wilkinsburg Automobile Co,. Winton Motor Car Co., M. H. Page.

# TENDENCIES OF FRENCH AUTO CONSTRUCTION

By W. F. BRADLEY.

AS an indication of the tendency of the best European constructors, the annual statistics compiled by M. Lucien Périssé on the Paris automobile show have more than a passing value. The last Paris show contained 150 constructors, 60 per cent. of which were French makers of complete chassis, 13 per cent. makers of motors and different parts and 27 per cent. foreign constructors. Of the 60 per cent. just mentioned, 54 per cent. consisted of internal explosion motors and only 6 per cent. steam, electric or mixed systems.

Leaving aside the exhibitors of assembled machines and a certain number who exposed complete cars having no distinctive features, 65 French constructors exposed 149 different types of automobiles driven by internal combustion motors. Comparing these 1907 models with those shown during the previous four years, the following table is obtained:

| Four-stroke motors— | 1902 | 1903 | 1904 | 1905 | 1906 |
|---|---|---|---|---|---|
| One cylinder | 12 | 15 | 6 | 8 | 6.5 |
| Two cylinders | 37 | 26 | 15 | 20 | 11 |
| Four cylinders | 48 | 55 | 76 | 71 | 75 |
| Three or six cylinders | 3 | 4 | 3 | 1 | 7.5 |
| Automatic inlet valves | 55 | 33 | 3 | 6 | 6 |
| Mechanical inlet valves | 45 | 67 | 97 | 94 | 94 |
| Separate cylinders | .. | .. | 35 | 33 | 33 |
| Cylinders in pairs | .. | .. | 65 | 63 | 59 |
| Cylinders in one casting | .. | .. | .. | 4 | 8 |
| Ignition by magneto, make-and-break | 22 | 32 | 26 | 39 | 24 |
| Ignition by magneto, with plugs | 0 | 6 | 23 | 45 | 72 |
| Ignition, various | 4 | 1 | 2 | 5 | 0 |
| Accumulators | 74 | 71 | 49 | 11 | 4 |

The show always being held in December, these figures refer to the succeeding year's models; 1906 figures, for instance, deal with 1907 machines.

In spite of the increased importance of six-cylinder engines, the four-cylinder type still remains the most popular for touring machines. The percentage of single-cylinder engines still remains high owing to the fact that several makers of light cars have adopted the De Dion engine, which is counted as a different type on each maker's chassis.

Considering the nominal horsepower of the machines—that is, the horsepower indicated in the catalogues—it is still the 24-30 type which has the largest number of representants.

Classifying the motors by their bore, the following figures are obtained:

| | Per Cent. |
|---|---|
| 70, 75 and 80 millimeters | 7.0 |
| 84, 85, 86, 87 and 90 mm. | 22.5 |
| 95 and 100 mm. | 22.5 |
| 105, 108 and 110 mm. | 13.2 |
| 112, 113 and 115 mm. | 7.9 |
| 120 mm. | 13.2 |
| 124 and 125 mm. | 4.0 |
| 130 mm. | 3.3 |
| 140 mm. | 3.3 |
| 145, 150 and 160 mm. | 4.0 |

No horizontal motors were shown. Comparing these figures with those of the London show, in which British and foreign machines were exposed, we find that in the British capital 72.5 per cent. were four-cylinder machines and 4.5 had single cylinders. The percentage of horizontal motors was 4.5, as compared with 11 per cent. in 1905. At the London show 55 per cent. of the machines had double ignition. At the Paris Salon all the builders with a very few exceptions were of the opinion that double ignition is now superfluous.

Considering the construction of the engine, we find that 39 per cent. of the motors had valves all on one side—that is, they had only one camshaft. Motors with valves on opposite sides and consequently two camshafts were 55 per cent. of the whole, while only 6 per cent. of the motors had their valves in the head. Compared with the figures for last year's show, it is seen that the proportion of machines with a single camshaft has sensibly increased. In two-thirds of the machines a governor was provided; in one-third it was not used.

Methods of cooling have little changed since last year. Air-cooled motors are practically non-existent. Thermo-siphon water circulation was employed on 14 per cent. of the engines and centrifugal pump on 67 per cent. The majority of the pumps were driven direct or through gears within the crank-case. One per cent. of the pumps had friction drive and 5 per cent. had springs. The honeycomb radiator is distinctly on the down grade, its proportion being 40 against 59 per cent. of winged and tubular radiators. One per cent. were various systems. The fan behind the radiator was most frequently found, 63 per cent.; 15 per cent. had the fan within the flywheel and the same percentage had the two systems.

Pressed steel frames continue their progressive march and have almost abolished the tubular frame. The latter is only used now for sub frames. The following figures show the tendency in frames and clutches:

| | Per Cent. | | | |
|---|---|---|---|---|
| | 1903 | 1904 | 1905 | 1906 |
| Pressed steel frames | 46 | 76 | 82 | 90 |
| Armored wood | 32 | 16 | 14 | 10 |
| Tubular and various | 22 | 8 | 4 | .. |

| | Per Cent. | | | | |
|---|---|---|---|---|---|
| | 1902 | 1903 | 1904 | 1905 | 1906 |
| Leather faced cone clutch, right | 74 | 80 | 60 | 51 | 54 |
| Leather faced cone clutch, inverted | 13 | 10 | 17 | 15 | 10 |
| Metallic clutches | .. | .. | 20 | 32 | 36 |
| Various types | 13 | 10 | 3 | 2 | .. |

There were a few special types of change-speed gears, such as the Fouillaron, with belt and extensible pulley, and that presented by the Swiss firm Turicum, but they were such a small number that they need not be considered. Change-speed gears of the sliding type can be classified as follows: Single sliding gear, 46 per cent.; double sliding gear, 31 per cent.; triple sliding gear, 22 per cent. One per cent. consisted of various systems. Direct drive on the high gear and the use of ball bearings remain as before, namely 88 per cent.; 2.7 per cent. of the machines under review carried the gear box within the rear axle casing, among them being the Henriod and Gillet-Forest.

The cardan shaft shows a large numerical superiority over final drive through side chains. This is partly accounted for by the fact that at the Grand Palais nearly every constructor showed a chassis intended for cab work or town use. For this class of vehicle the cardan shaft offers distinct advantages over chains; several important firms, among them Mors, C. G. V. and Fiat, have indeed not hesitated to adopt this type while maintaining side chains for their more powerful touring cars. The percentage of machines with chain and cardan shown during the last six years is as follows:

| | 1901 | 1902 | 1903 | 1904 | 1905 | 1906 |
|---|---|---|---|---|---|---|
| Side chains | 50 | 62 | 53 | 49 | 48 | 37 |
| Shaft drive | 44 | 35 | 47 | 51 | 52 | 63 |

De Dion-Bouton machines have double shaft; a few firms, among them Aries and Chenard & Walcker, have special rear axles and a few Lyons firms have direct drive on third speed.

Internal brakes were in a large majority, for they represented 90 per cent. of the total, a figure distinctly in advance of last year. External brakes were only used in a few special cases or on cheap cars. There was a strong tendency towards the use of soft metals for rear wheel brakes. Where the brake consists of steel on steel the band was always of a softer steel than that used for the drum. The metals used for all types of brakes were as follows:

| | | | | 1906 | | |
|---|---|---|---|---|---|---|
| | 1903 | 1904 | 1905 | Wheel Brakes | Transmission Brakes | Average |
| Cast iron on steel | 0.26 | 0.36 | 0.51 | 0.48 | 0.45 | 0.465 |
| Bronze on steel | 0.17 | 0.17 | 0.32 | 0.25 | 0.28 | 0.265 |
| Steel on steel | 0.33 | 0.30 | 0.13 | 0.21 | 0.22 | 0.215 |
| Various | 0.24 | 0.07 | 0.04 | 0.06 | 0.05 | 0.055 |

# HOW LEVAVASSEUR BUILT HIS LIGHT MOTOR

By CAPTAIN FERBER.

PARIS, March 20.—With the prospect of the problem of aerial navigation being solved in the near future, it is interesting to note how Levavasseur, the French engineer, constructed his first extra light motor, now being used by Santos-Dumont and other pioneer aeroplanists. Captain Ferber tells the story as follows in a recent number of *Omnia*:

My friend Archdeacon is to blame for whatever has been done, for he got it into his head that if I met Levavasseur some good might result to the cause of aviation. At that time no automobile constructor had paid any attention to flying machines, and I had wondered if I should have to build an engine for myself. In 1903 I had tried a 6-horsepower Buchet and in 1905 a 12-horsepower Peugeot. Power had been doubled without an increase of weight, but it was not enough. The motor boat *Antoinette* then held all records for her force, 80 horsepower, and was the lightest motor in existence. I said to Levavasseur:

"Why did you make such a light motor for a boat?"

"It is a light motor," replier Levavasseur, "but I did not intend it for a boat; I wanted to put it on an aeroplane."

"How did that happen? Nobody seemed to know anything about it."

"Nobody would buy an aeroplane, so I put the aeroplane motor in a boat which people would buy."

"How did you get it so light?"

"Simply by employing aluminum everywhere where the metal had no efforts to support. I made numerous experiments in physics and was able to reduce every piece to the minimum while still keeping a good margin of safety. My cylinders were ground inside and out to get the desired dimensions and were equipped with a brass water jacket. Finally, instead of eight cylinders, I used sixteen or even thirty-two."

"You reduce weight by increasing the number of cylinders?"

"Certainly; the lineal speed of a piston cannot exceed eight meters a second, you know that. The power of a motor only increases according to the square of its dimensions, while the weight increases according to the cube. It is better to have a number of small cylinders than one big one. I have no vibration and I have no need of a flywheel. Then, as I have always two cylinders under pressure, I can start by switching on the current. Won't that do for your aeroplane?"

"That will be fine," I replied. "When the wind is favorable I can cut out my motor, sail through the air, economize gasoline, and start up again without cranking."

"Why, nobody has done that yet on a steerable balloon," said Levavasseur.

"Mine isn't a steerable balloon; it's an aeroplane."

"Then with my motor you can go astern without any increase in weight, simply by shifting the camshaft."

"That is an old dodge," I replied.

"Not so old; I have got a German patent on it, and German patents are not easy to get."

"What about the carbureter?"

"I have abolished the carbureter. Experiments have shown that with a polycylindrical motor it is impossible to prevent one of the cylinders taking all the fuel. I feed the cylinder by means of special piping and a pump with whatever they need, gasoline, kerosene, hydrogen. Steerable balloons need not waste their gas; they can use it in the motor."

"Leave the balloons alone; tell me what you will do about ignition."

"I shall have a coil."

"Not a magneto?"

"No. First of all, it is too heavy; then with eight cylinders there is not enough time to fire all of them. I should have them all firing at the same time."

I was charmed with the prospect of obtaining the motor I wanted for my aeroplane and rushed off to my superior officer's bureau at Chalais and cried:

"Sir, I have found the motor I want."

"Eh?"

"Yes, sir; I must buy it at once."

"You are in a hurry; let us look at it first and see if it does give 24 horsepower for two kilograms."

"But, sir, I cannot bring it; it is not begun yet."

"Ferber, you are mad. Do you want me to buy it with my eyes shut? Suppose it is too heavy."

"But, sir, that does not matter. It is lighter than any of the others."

"My good fellow, you are completely mad. I shall not allow the Government to have anything to do with such an affair. You can go."

There was nothing to be got from the State, so I gave the order myself. I ought to have had the first engine; I am getting the last, after everybody else. It is my fault for ordering a special motor instead of taking the standard type. Santos-Dumont came along, tried a "24" immediately, found it insufficient, gave an order for a "50" and is now waiting for a "100."

I got my motor, built my aeroplane and had all ready last November. Then orders came to have the Government steerable balloon *Lebaudy* ready for sending to the Eastern frontier. The order was executed, my poor machine being left out of doors for a few nights. There was a heavy storm, the balloon could not start, of course, and my machine was destroyed. Of course, I feel mad against that steerable. But I don't care; they will soon get their last kick. I am going to start again—in another place.

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Features of the Antoinette 16-cylinder 100-horsepower motor are, bore and stroke 4.1 inches, weight 220 pounds, length over all 50 inches, width 24 inches, height 19 inches, revolutions 1,400 per minute.

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## SKY DOINGS OF THE CLOUD BRIGADE.

Alan R. Hawley, of the Aero Club of America, and A. N. Chandler, president of the Aero Club of Philadelphia, had a successful balloon trip from Philadelphia to the neighborhood of Atlantic City Saturday last. The balloon, the *Initial*, was inflated at the Point Breeze gas works, and went away without a hitch. At one time the balloon rose to a height of 7,000 feet, due to suddenly passing into the full rays of the sun, after having thrown ballast overboard. After a little difficulty in hooking the anchor, the sky pilots were pulled up by a friendly tree. Mr. Hawley scrambled down the rope and secured the balloon.

Santos-Dumont has been unable to do much outside work in Paris owing to the boisterous March wind. A recent little preliminary canter over the Saint-Cyr drill ground, a quiet run to see that all was in order, and not an attempt to fly, resulted in one of the propellers being snapped off.

M. Alfred Le Blanc and Mr. Mix had a thousand-kilometer flight in the balloon *Limousine* last Sunday evening. Leaving Paris at 6 o'clock, they landed the next evening in the Isle of Rugen, Germany. The outward journey, including all expenses, cost $50; the return trip by rail, however, called for an expenditure of $100.

James Gordon Bennett has sent to the Aero Club of France a magnificent souvenir of the first international balloon race held from Paris last year. The gift consists of a silver plate made by Aucoc, the famous Parisian silversmith, representing the cup in the center of a decorative design. The Aero Club of America will receive a similar souvenir.

## KEROSENE AUTO BOAT FOR PILOT WORK.

PARIS, March 19.—Launching ceremonies and motor boat trial trips are daily occurrences now on the reaches of the Seine, and will continue until the two special trains leave the Gare de Lyon with their load of motor boats for Monaco. This week the Société des Vedettes Automobiles invited a party of press men to Juvisy, a few miles out of the city, to witness the trial runs of

INITIAL TRIP OF FRENCH PILOT MOTOR BOAT.

their new automobile pilot boat. This company is making a specialty of the construction of sea-going automobile craft known as vedettes, for use as scout boats in the navy, and for various service around the coast, where speed and prompt service are required. *Pilot I.*, which took the water to-day, has been specially constructed for pilot communication with incoming and outgoing vessels. She is a stoutly built craft, capable of facing a heavy sea. Her length is 30 feet over all, the hull is built entirely of four-millimeter steel, and is completely decked over. The deck cabin is sufficiently high for a person to stand upright and is only 40 inches above the deck level.

The motive power is a three-cylinder 25-horsepower Mietz & Weiss kerosene motor of the type which recently gained second prize in a competition organized by the French naval authorities. Twelve minutes only are required to start the motor and obtain the maximum speed of 600 revolutions per minute. The boat averages eight miles an hour in open water, a speed quite sufficient for the work she will be called upon to perform. *Pilot I.* will take part in the Monaco meeting. In our illustration showing her at work on the Seine, Comte Recopé is standing forward against the pilot house and amidships is Henry Kapferer, the aeroplanist.

## NINE DISTINCT TYPES OF AEROPLANE.

PARIS, March 18.—According to *Omnia*, there are nine distinct types of aeroplanes actually in existence or under construction which can lay claim to serious attention. Without any attempt to place them in order of merit, they are:

1. Santo-Dumont's new aeroplane, consisting of six cells, with a bearing surface formed of thin mahogany in place of the varnished cotton used in the 14 *Bis*. Width of wings is 24 inches, total bearing surface 13 square meters, and reduction of weight on the previous model 66 pounds. Motor, 50-horsepower Antoinette eight-cylinder, to be replaced by 100-horsepower sixteen-cylinder Antoinette weighing 220 pounds, under construction.

2. Bleriot aeroplane of the monoplan type, bearing surface 15 square meters, weight 550 pounds, motor 20-24-horsepower. M. Bleriot is now completing another aeroplane fitted with a 50-horsepower sixteen-cylinder engine.

3. Delagrange cellular aeroplane, bearing surface 60 square meters, weight 638 pounds, motor 50-horsepower Antoinette. Has only made one trial trip, which revealed fragile construction.

4. Vuia aeroplane, area 12 square meters, 12-horsepower carbonic acid motor, designed by Léon Serpollet.

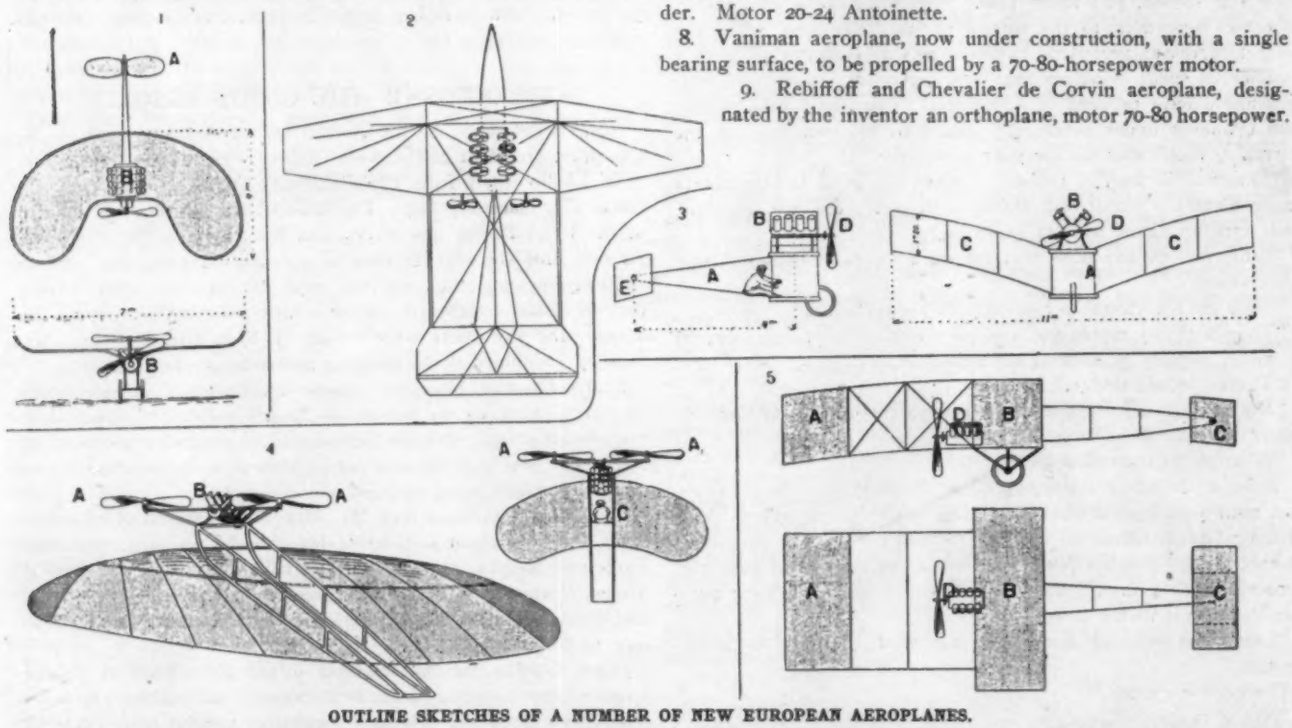
5. Kapferer cellular aeroplane, bearing surface 60 square meters, weight 616 pounds, motor 20-horsepower Buchet.

6. Count de la Vaulx aeroplane, with a single bearing surface, built on the model of a flying bird, in the rear two propellers turning inversely, driven by a 50-horsepower motor.

7. Ignaz and Vels aeroplane, with a single curved bearing surface, having much resemblance to a maple leaf. There is no rudder. Motor 20-24 Antoinette.

8. Vaniman aeroplane, now under construction, with a single bearing surface, to be propelled by a 70-80-horsepower motor.

9. Rebiffoff and Chevalier de Corvin aeroplane, designated by the inventor an orthoplane, motor 70-80 horsepower.




OUTLINE SKETCHES OF A NUMBER OF NEW EUROPEAN AEROPLANES.

1. Bleriot Aeroplane: a, rudder; b, 24-horsepower motor. 2. Comte de la Vaulx Aeroplane: two propellers and 50-horsepower Antoinette motor. 3. Santos-Dumont Aeroplane, latest model: a, framework; b, Antoinette 50-horsepower motor; c, wings; d, propeller mounted direct on motor shaft. 4. Ignaz Etrich & Wels Aeroplane shown in perspective and from above: a, a, propellers; b, 24-horsepower Antoinette motor. 5. Delagrange Aeroplane: a, b, cellular bearing surfaces; c, rudder; d, 50-horsepower Antoinette motor.

# LIMITS OF TOLERANCE IN AUTOMOBILE PARTS

By THOS. J. FAY, E.E.

AUTOMOBILE construction, to a far greater extent than machining work in general, requires that the duplication of parts be in fact rather than in theory, the true situation in relation to this matter being, more or less, one handled rather glibly by the able advertising manager, or, to more elegantly put it, "The Publication Department," in many establishments noted for the quality of their products. Unqualified, the above statements sound harsh, and would be pronounced of exaggerated breadth by mostly every maker of cars, for of all none would admit for one moment that parts are always in duplicate.

On the other hand, what is called the duplication of parts is another matter; what most makers really mean is that the cars are crystallized and the parts are produced by means of jigs, templates and gages, in so far as the exigencies of the situation would demand or warrant. In other words, if a part can be produced by means of a jig, a fixed tool or a process, at less cost than the same part could be produced by the ordinary process, as in a jobbing shop for illustration, of course resort is had to the cheapening process, and fortunately uniformity to a greater or less extent follows the process.

To attack the matter in hand from still another point of view would be to say certain parts can be produced to any desired degree of accuracy on a lathe in conjunction with a grinder, but the process would be slow in comparison, if, perchance, the parts in question could be produced on an automatic screw machine or on a semi-automatic turret lathe, or by any other multiple tool process, more or less automatic, by means of which quantity naturally takes precedence, or less quantity by the more laborious but not less accurate engine lathe.

### Absolute Accuracy Impractical.

As a matter of fact, quick work on automatic tools is not, nor can it be, absolutely accurate; moreover, there is no good reason why absolute accuracy should be attempted, but the sum of the inaccuracies, even if arranged in algebraic order, do not of necessity equal zero, while the small inaccuracies as between connecting parts may be of such moment as to abort fitting, by a man of ordinary skill, without resort to tools such as lathes, mills or whatever would serve to wipe out differences in fitting parts.

The duplication of parts, then, is rarely the duplication promised by the "Publication Department," for, according to the flowing language of the persuading staff, a part, if replaced by a new part, will be replaced without any trouble at all; in fact, the new part will fall right into place and serve perfectly. This is obviously a wrong view to take, nor can this view be foisted on an autoist after he has used up his first car, for ere one car is ready to sell for "as good as new" the owner will have secured good and wholesome views of just what a duplicate part really does mean. Why should parts go together without any "fitting" at all? Drawings are usually turned out showing that a 2-inch shaft, for illustration, is to go into a 2-inch hole. Some say it is possible, more claim it is not; but the writer claims that the owner of a car will be much engaged if any attempt is made to solve the problem. In shops in general, fitting allowances are left to the foreman or the workman, but in a large shop there are a good many workmen and several formen, hence it follows that all allowances are not from the same point of view or on the same basis, because all men do not think alike, nor is there any rational ground for expecting any such a phenomenon.

In an automobile there are a goodly number of situations and several conditions to satisfy, hence allowances for fitting must take into account the respective conditions for the respective places, else fitting will be a dire undertaking, with every chance of a loose fit where a tight fit would be proper or a drive fit in place of a loose fit, and so on. Just how any set of workmen, however qualified to do good work, can satisfy so great a variety of conditions without a preconceived plan, is past all conception. To have parts come so accurate as to require no fitting work at all is extremely difficult, and demands that a system of allowances be devised and used. A system of allowances, or, as the matter is generally referred to, "limits of tolerance," are not new, nor do all shops disregard the matter, but the point is made that even shops that do take into account a prearranged system or set of limits to go by fall short in that the system is rarely worked out complete, or if it is worked out it is not followed out, mainly because draftsmen leave it to foremen and foremen pass it up to workmen, while the latter, accustomed as they are to doing things, make the best of the situation and the allowances as in their judgment *would seem to serve the end.* In many cases they are quite right, but it is too much to expect to be able to buy all the cardinal virtues for $15 per week, and the risk of failure is ever present in this class of mechanical work.

| | Diameter of Shaft | | | |
|---|---|---|---|---|
| Diameter of Part | Greater Press Fit | Greater Drive Fit | Less Hand Fit | Less Nominal Fit |
| 1" | .001" to .002" | .0005" to .0015" | .001" to .002" | 0 to .002" |
| 2" | .002" to .003" | .001" to .002" | .0015" to .0025" | 0 to .002" |
| 3" | .003" to .004" | .0015" to .0025" | .0025" to .0035" | 0 to .002" |
| 4" | .004" to .005" | .002" to .003" | .002" to .003" | 0 to .003" |
| 5" | .005" to .006" | .0025" to .0035" | .0025" to .0035" | 0 to .003" |
| 6" | .006" to .007" | .003" to .004" | .0035" to .0045" | 0 to .003" |
| 7" | .007" to .008" | .0035" to .0045" | .003" to .004" | 0 to .004" |
| 8" | .008" to .009" | .004" to .005" | .0035" to .0045" | 0 to .004" |
| 9" | .009" to .010" | .0045" to .0055" | .0035" to .0045" | 0 to .004" |
| 10" | .010" to .011" | .005" to .006" | .0035" to .0045" | 0 to .005" |
| 11" | .011" to .012" | .0055" to .0065" | .004" to .005" | 0 to .005" |
| 12" | .012" to .013" | .006" to .007" | .0045" to .0055" | 0 to .005" |

**TABLE I (ENGLISH).**—Serviceable for fits of members with a fixed relation, but not for journals, considering parallel work. In these cases the bore of the holes should be within .0005 inch below the drawing size given, and the shaft or other part should change the amounts of these allowances above or below the diameter for the hole, as the case may be, considering the purpose.

### System Necessary to Meet Requirements.

The only way by means of which duplicate parts can be produced with sufficient accuracy to enable one to fit a new part—that is, a replacement—is if the limits of tolerance are worked out for every situation and the system is followed up completely and under the direct supervision of some one man skilled in the process of making allowances. That is, in a shop big enough to talk about. A system of this sort is based on inaccuracy; in other words, the system allows for errors and allows as much error for each case as the situation will permit, but the system fixes not only the magnitude but the direction of errors, and by so doing enables machinists to come within a fitting range, because *the errors are not added one to the other.*

A system, for illustration, takes into account the oil film that must be allowed for in places using oil, and disregards the pressure of oil, if oil is not to be present. Such a system allows for varying diameters of parts to be fitted and the ease with which accuracy can be realized in some places as against the

DIAMETER OF SHAFT

| DIA. OF PART | GREATER PRESS FIT | GREATER DRIVE FIT | LESS HAND FIT | LESS NOMINAL FIT |
|---|---|---|---|---|
| 25 | .025 To .05 | .0125 To .0375 | .025 To .05 | 0 To .05 |
| 50 | .05 To .075 | .025 To .05 | .032 To .057 | 0 To .05 |
| 75 | .075 To .1 | .0375 To .0625 | .042 To .067 | 0 To .05 |
| 100 | .1 To .125 | .05 To .075 | .05 To .075 | 0 To .075 |
| 125 | .125 To .15 | .0625 To .0875 | .057 To .082 | 0 To .075 |
| 150 | .15 To .175 | .075 To .1 | .067 To .092 | 0 To .075 |
| 175 | .175 To .2 | .0875 To .1125 | .075 To .1 | 0 To .1 |
| 200 | .2 To .225 | .1 To .125 | .081 To .106 | 0 To .1 |
| 225 | .225 To .25 | .1125 To .1375 | .087 To .112 | 0 To .1 |
| 250 | .25 To .275 | .125 To .15 | .094 To .119 | 0 To .125 |
| 275 | .275 To .3 | .1375 To .1625 | .1 To .125 | 0 To .125 |
| 300 | .3 To .325 | .15 To .175 | .106 To .131 | 0 To .125 |

TABLE II (METRIC).—Serviceable for fits of members with a fixed relation, but not for journals, considering parallel work. In these cases the bore of the holes should be within .0125 inch below the drawing size given, and the shaft or other part should change the amounts of these allowances above or below the diameter for the hole, as the case may be, considering the purpose.

difficulty involved in attaining accuracy in other places. Taper fits are resorted to when possible on the ground that a taper fit can always be counted on for a good fit, but unfortunately taper fits cannot be taken advantage of in many places. Indeed, the idea with an allowance system is to provide a suitable allowance for every character of a fit, in every location, so that nothing will be left to chance or the individual judgment of abstract man.

It is all right enough to take advantage of the knowledge possessed by men of skill and experience, but that knowledge should be reduced to a concrete form and its use should be confined to a legitimate zone on the ground that changing the conditions must result in changes all along the line. Some years ago the writer, as "executive engineer" of the C. W. Hunt Company, used a set of allowances or tubular limits of tolerance devised by Mr. Hunt

| DIAMETER OF PART | BORE OF HOLE GREATER THAN DIAMETER OF SHAFT | | | |
|---|---|---|---|---|
| | CLOSE FIT | FREE FIT | LOOSE FIT | NOMINAL FIT |
| 1" | .003" To .005" | .008" To .011" | .023" To .028" | 0 To .002" |
| 2" | .004" To .006" | .009" To .012" | .026" To .031" | 0 To .00225" |
| 3" | .005" To .007" | .010" To .013" | .029" To .034" | 0 To .0025" |
| 4" | .006" To .008" | .011" To .014" | .032" To .037" | 0 To .00275" |
| 5" | .007" To .009" | .012" To .015" | .036" To .040" | 0 To .003" |
| 6" | .008" To .010" | .013" To .016" | .038" To .043" | 0 To .0035" |
| 7" | .009" To .011" | .014" To .017" | .041" To .046" | 0 To .004" |
| 8" | .010" To .012" | .015" To .018" | .044" To .049" | 0 To .0045" |
| 9" | .011" To .013" | .016" To .019" | .047" To .052" | 0 To .005" |
| 10" | .012" To .014" | .017" To .020" | .050" To .055" | 0 To .0055" |
| 11" | .013" To .015" | .018" To .021" | .053" To .058" | 0 To .006" |
| 12" | .014" To .016" | .019" To .022" | .056" To .061" | 0 To .0065" |

TABLE III (ENGLISH).—Serviceable for bearings and similar work. In all cases while figures given are for bore of hole greater than diameter of shaft, the bores should be within .0005 inch of standard dimension given, and the shaft or part to fit the hole should have the allowance here given, below the standard dimension given on drawing

and found the allowances quite in keeping with the requirements. Later on, when the automobile question demanded better attention, the writer revised the tubular values from time to time and broadened the system in all ways consistent with experience and new conditions. The values were also reduced to the metric system under stress of circumstances and additional tables were compiled, with a view of covering the whole subject.

### Metric Measurements an Aid.

The question of the extent to which the metric system will, in future, be employed in America is one for the future to settle, but the writer has adopted the metric system and is using it in his regular practice to very good advantage, and it is believed an actual gain in time, as well as a reduction of possible errors, can be directly traced to the use of the metric system.

Before proceeding to employ the metric system, one of the most important matters was to fix up the tables of allowances in metric increments, because numerous workmen were not able to think in metric values, so to speak. This matter was not found to be as troublesome as might be supposed, because in automobile work a great number of the artisans are from abroad and came here as an adjunct to foreign automobiles.

BORE OF HOLE GREATER THAN DIAMETER OF SHAFT

| DIA. OF PART | CLOSE FIT | FREE FIT | LOOSE FIT | NOMINAL FIT |
|---|---|---|---|---|
| 25 | .075 To .125 | .2 To .275 | .275 To .7 | 0 To .050 |
| 50 | .1 To .15 | .225 To .3 | .65 To .775 | 0 To .056 |
| 75 | .125 To .175 | .250 To .325 | .725 To .85 | 0 To .063 |
| 100 | .150 To .2 | .275 To .350 | .8 To .925 | 0 To .069 |
| 125 | .175 To .225 | .3 To .375 | .875 To 1.00 | 0 To .075 |
| 150 | .2 To .25 | .325 To .4 | .95 To 1.075 | 0 To .081 |
| 175 | .225 To .275 | .350 To .425 | 1.025 To 1.15 | 0 To .1 |
| 200 | .250 To .3 | .375 To .450 | 1.1 To 1.225 | 0 To .113 |
| 225 | .275 To .325 | .4 To .475 | 1.175 To 1.3 | 0 To .125 |
| 250 | .3 To .35 | .425 To .5 | 1.25 To 1.375 | 0 To .131 |
| 275 | .325 To .375 | .45 To .525 | 1.325 To 1.45 | 0 To .15 |
| 300 | .35 To .4 | .475 To .550 | 1.4 To 1.525 | 0 To .163 |

TABLE IV (METRIC).—Serviceable for bearings and other similar work. In all cases, while figures given are for bore of hole greater than diameter of shaft, the bore should be within .0125 inch of standard dimension given, and the shaft or part to fit the hole should have the allowance here given, below the standard dimensions given on drawing.

In any case it is well to have the limits of tolerance both in the English and metric measure, because the large number of foreign cars found in America are in metric measure, and in repairing them success depends, to some extent, at any rate, upon the use of the metric system. This point is not as broad as one might suppose, for, as can be reasoned, a repair is only made if a part wears, and just as likely as not the wear of the adjacent connecting part will be enough to make it possible to employ English units without detriment to the fit of the replacement to the connecting part.

As may be conjectured, the writer is not aiming to bolster up the metric or any other system, for in all truth the quality of a product is in the main independent of the units of measure, and one is perfectly free to use the one or the other of the systems; indeed, to be able to do so, the tables of allowances were broadened and extended, as before stated. The allowances differ in some ways from allowances as published by some concerns, and for the matter of that the writer knows of some published allowances that, if followed, spell failure, because they are neither right in theory nor adjusted to the needs of the situation.

Take a shrink fit, for illustration. If the allowance for fit is excessive, the inner member will collapse or the exterior member will split, or both members deform. This is an every-day occurrence and it is due to a lack of knowledge of the allowance that should be made for shrink fits. It is quite easy to strain the method beyond the elastic limit. In many places the fit can be anything but accurate and the result may not be impaired; moreover, a great many dimensions of parts are quite independent of any fit at all, hence to machine to dimensions closely would be a waste of time and money, to no avail. The system of allowances, then, is based on the assumption that no part can be machined to "neat" size and the principle of "error" is admitted. The real question, then, is one involving an allowable error, and the tables tell how much of an error will be permissible, but the error must be in a certain defined place, as, for illustration, in a "drive" fit the "bore" should be a "reamed" size, within, say, .005 of an inch below size. The shaft should be over size by some amount, depending upon the diameter of the shaft. Take, for illustration, a 4-inch shaft; for a drive fit

| | DIAMETER OF HOLE TO BE LESS THAN SHAFT BY | | |
|---|---|---|---|
| DIA. OF PART | PRESS FIT | DRIVE FIT | HAND FIT |
| 1" | .005" To .006" | .0005" To .0015" | .0000 To .001" |
| 2" | .006" To .007" | .001" To .002" | " " |
| 3" | .007" To .008" | .0015" To .0025" | " " |
| 4" | .008" To .009" | .002" To .003" | " " |
| 5" | .009" To .010" | .0025" To .0035" | " " |
| 6" | .010" To .011" | .003" To .004" | " " |
| 7" | .011" To .012" | .0035" To .0045" | " " |
| 8" | .012" To .013" | .004" To .005" | " " |
| 9" | .013" To .014" | .0045" To .0055" | " " |
| 10" | .014" To .015" | .005" To .006" | " " |
| 11" | .015" To .016" | .0055" To .0065" | " " |
| 12" | .016" To .017" | .006" To .007" | " " |

TABLE V (ENGLISH).—For 3-16 in. to 1 foot taper fits of parts. In every case make the male member within .0005 inch above the standard size given.
For ½ in. to 1 foot, divide above values by 2.
For ¼ in. to 1 foot, divide above values by 4.
For 1½ in. to 1 foot, divide above values by 8.

the shaft should be from .002 of an inch to .003 of an inch above size. This allows .001 of an inch to go on and a plus allowance great enough to guarantee a "drive" fit, even though the bore be slightly off, but as a guarantee against trouble from this source the bore should be slightly under, as provided.

Table I gives the limits of tolerance for press, drive, hand and nominal fits, using English measurements, and considering what has been said the table should be clear enough without further explanation. It will be understood that by "diameter" is meant the diameter of any given part nearest to the tabular diameters.

Table II gives the limits of tolerance under the same conditions as would obtain for Table I using the metric system instead of the English system of measurements.

Table III gives the limits of tolerance under still another set of conditions. In this case the "bore" is considered as within .0005 of an inch of the standard, making it possible to use standard reamers and the allowances are minus values on the shaft, taking into account close, free, loose and nominal fits.

Table IV gives the limits of tolerance under the same conditions as would obtain for Table III, using the metric system instead of the English system of measure.

Table V gives the limits of tolerance for taper fits, taking into account tapers, viz., 3-16 of an inch, 3-8 of an inch, 3-4 of an inch and 1 1-2 inches to 1 foot. These tapers are enough to cover all possible cases in automobile work on a basis as follows:

| | DIAMETER OF HOLE TO BE LESS THAN SHAFT BY | | |
|---|---|---|---|
| DIA. OF PART | PRESS FIT | DRIVE FIT | HAND FIT |
| 25 | .125 To .150 | .0125 To .025 | .0025 To .025 |
| 50 | .150 To .175 | .025 To .05 | " " |
| 75 | .175 To .2 | .037 To .063 | " " |
| 100 | .2 To .225 | .05 To .075 | " " |
| 125 | .225 To .250 | .063 To .087 | " " |
| 150 | .250 To .275 | .075 To .1 | " " |
| 175 | .275 To .3 | .087 To .113 | " " |
| 200 | .3 To .325 | .1 To .125 | " " |
| 225 | .325 To .350 | .113 To .137 | " " |
| 250 | .350 To .375 | .125 To .15 | " " |
| 275 | .375 To .4 | .137 To .163 | " " |
| 300 | .4 To .425 | .15 To .175 | " " |

TABLE VI (METRIC).—For 1 to 64 taper fits of parts. In every case make the male member within .0125 inch above the standard size given.
For 0 to 32 taper, divide above values by 2.
For 1 to 16 taper, divide above values by 4.
For 1 to 8 taper, divide above values by 8.

Three-sixteenths of an inch to 1 foot, for parts not to be taken apart, unless when broken or worn out, as flywheels on crankshafts and like cases.

Three-eighths of an inch to 1 foot, for parts likely to have to be pulled apart, but to be securely held, as sprockets on jackshafts and like work.

Three-fourths of an inch to 1 foot, for parts to be taken or pulled apart at intervals.

One and one-half inches to 1 foot, special cases, but not much used.

Table VI represents the same class of work, using the metric instead of the English system. In this case that taper for

| APPROXIMATE DIMENSION OF PART | LIMITS OF TOLERANCE + OR − |
|---|---|
| 1" | .002" |
| 2" | .002" |
| 3" | .002" |
| 4" | .003" |
| 5" | .003" |
| 6" | .003" |
| 7" | .004" |
| 8" | .004" |
| 9" | .004" |
| 10" | .005" |
| 11" | .005" |
| 12" | .005" |

TABLE VII (ENGLISH).

| APPROXIMATE DIMENSION OF PART | LIMITS OF TOLERANCE + OR − |
|---|---|
| 25 | .05 |
| 50 | .05 |
| 75 | .05 |
| 100 | .075 |
| 125 | .075 |
| 150 | .075 |
| 175 | .1 |
| 200 | .1 |
| 225 | .1 |
| 250 | .125 |
| 275 | .125 |
| 300 | .125 |

TABLE VIII (METRIC).

Allowances to go by in all cases if specific limits are not given on drawings.

the equivalent of 3-16 of an inch to 1 foot is set down as 1 to 64, hence the other tapers would be 1 to 32, 1 to 16 and 1 to 8, respectively, for 3-8 of an inch, 3-4 of an inch and 1 1-2 inches to the foot, respectively.

Table VII takes into account the limits of tolerance of dimensions and parts not required to be definite, but in which an allowance can be made such as will enable machinists to easily and quickly come down to a size close enough for all practical purposes. Table VIII is the metric equivalent of Table VII.

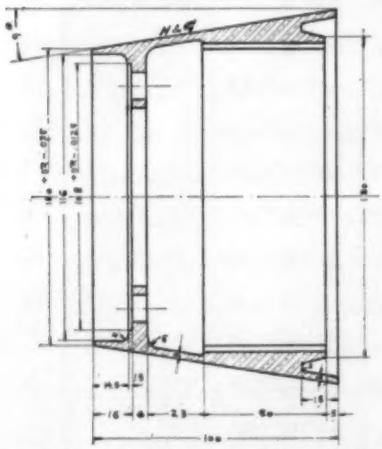


FIG. 1.—Method of noting on section.

These tables—VII or VIII, as the case may be—are to be used to go by in all cases in which specific limits of tolerance are not given on the drawings for each important dimensional value.

The method of noting limits of tolerance on drawings is one worthy of discussion. Draftsmen in making drawings put down "neat" dimensions, making no allowance at all, as, for illustration, a 2-inch shaft is shown to go into a 2-inch hole. The person assigned to make allowances then takes the drawings and puts down the allowances as "plus," "minus," or "plus and minus" values in juxtaposition to the dimensional values to be influenced, as follows: (A)2"+.002, if the dimension is to be .002 more than 2"; or (B)—.002 where the reverse; and where permissible to have fit come between either of these limits, (C)2"+.002.

### Advantages of Such a System.

The objects in thus fixing the allowances are threefold, viz.: (a) In order that draftsmen will not be required to waste time making allowances, thus enabling them to put down "neat" dimentions. (b) In order that one man skilled in the practise can go over the drawings and append the allowances. (c) In order that machinists will know at sight not only that allowances have to be made, but the magnitudes of allowances as well. Unless machinists can see that fits are provided for, they, by virtue of their training, are bound to give the matter further attention, and they will best be able to see at a glance if all allowances are put down in the manner as above set forth.

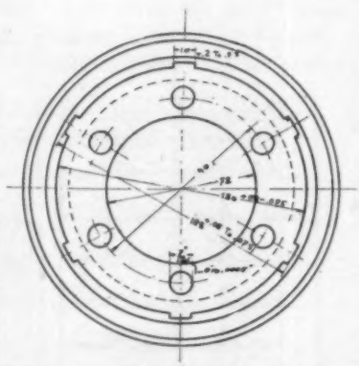


FIG. 2.—How allowances are noted on plan.

The drawings Figs. 1 and 2 show just how allowances are noted, remembering that the absence of allowances authorizes machinists to use the values in Table VII or VIII, English or metric, as the case may be.

In conclusion, there is one further point of magnitude sufficient to warrant discussion, viz., the taper as given, 3-16 of an inch to the foot, has an especial value in that an advance of one member into the other of 1-16 inch is at the expense of a difference in diameter of 0.001 inch nearly. It follows that a "taper play," if marked off by rings 1-16 inch apart, serves as a source of definite information to the machinist. Without this plug gage, measuring a taper hole becomes a matter of no small concern.

## A WORD FOR BELT TRANSMISSION.

Automobile engineers have been largely recruited from the ranks of bicycle makers, and it is only in recent years that true engineers have given any attention to motor car work, says *The English Mechanic*. Hence, original errors have been to a large extent perpetuated, though by the use of improved material and better workmanship, such crude ideas as the sliding of gear wheels into mesh while revolving have to some extent turned out better than one would have expected. There is no reason why a belt should not be as successful in transmitting power on a motor car as it is in driving the machine tools used in the construction of the cars. There are plenty of belts made that will run equally well when wet as when dry, and we can always protect the belt from actual contact with mud and water, leaving only atmospheric conditions to contend with. Then as regards economy of first cost and upkeep, the belt is far ahead of gearing. Again, who could repair a broken gear when on the road, even if a spare wheel be at hand? In most designs it means half a day's work to get the old wheel out and another half-day to replace the parts and get the car into running order again. Anyone could put a new belt on, and a spare is easily carried. The whole reason for the apparent failure of belt-driving is due to the use of belts too narrow for the power, and too small pulleys placed too close together. Given a decent width of belt, pulleys as large as the space allows, and shafts as far apart as possible, and the result will be a car of simple design, cheap to make and maintain, easy to repair, and more silent than any gear-driven vehicle. I would go further than Mr. Smith by eliminating the gears he mentions, by having fast and loose pulleys only. Surely this device has been well enough tested and exploited in the many engineering and other works all over the world for us to have confidence in it. Mr. Smith's specification does not want much alteration; do away with the gears and use fast and loose pulleys, is my amendment. Differential gear we must have; but this is not likely to give trouble, or make noise, if well designed. It will be interesting to have the views of readers on the subject, and probably some valuable suggestions will result.

## WHAT HAPPENS TO OVER-STRAINED METAL.

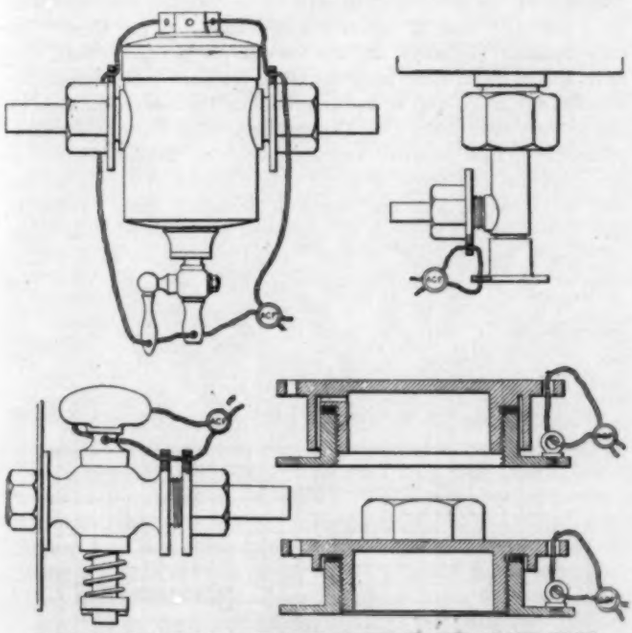
Will the time ever come when we shall know what has really happened to a piece of over-strained material? asks the *American Machinist*. It has been usual to suppose that its particles were already partially severed—pulled apart by tension so that they were in a sense past repair. But recent investigations appear to show that this is not the case, but that both for iron and for steel the over-strained state gradually disappears, and ultimately an over-strained piece gets near to its original condition. A piece of semi-mild steel strained at its yield point of 38 tons until it took a permanent set of 0.13 in. in 4 in., regained a lot in two days, progressed for two weeks and was entirely perfected by heating to 200 deg. C., though a few minutes at 100 deg. C. would have served nearly equally well. Other metals recover from overstrain with rest, and more quickly by the application of moderate heat, and both aluminum and copper have been tested. Aluminum bronze recovers very slowly with time, but rapidly with moderate heat treatment.

## AUTOS FOR THE HEART OF DARKEST AFRICA.

The almost uncivilized tribes of Southern Nigeria are about to be introduced to the most recent development of modern civilization, says *The Egyptian News*. The first motor-car to be used in the Protectorate is now on its way, a smart touring vehicle built to the order of the High Commissioner, Sir Walter Egerton, for his own private use. Hitherto road surfaces in Nigeria have been so bad, generally speaking, as to render vehicular traffic of the motor type impracticable, but new roads are being made and railways are springing up in all directions. With facilities for petrol and "spares," no doubt the motor-car will meet in Southern Nigeria with a modicum of that success which has attended its introduction into other comparatively unknown countries.

# WHAT AUTO INVENTORS ARE DOING ABROAD

AS fuel consumption is to play an important part in the speed contests to be held during the present season in France, the driver or builder who by some clever artifice is able to provide his car with an additional five or ten litres of the precious *essence* will have an incalculable advantage. To quote a late issue of *Omnia*, from which the present is an extract, "he will be able to give his motor a stomach that much bigger,



DEVICES ADOPTED TO PREVENT FRAUD IN THE GRAND PRIX.

FIG. 1.—Method of sealing filter.
FIG. 2.—How stopcocks will be sealed.
FIG. 3.—Seal on carbureter intake.
FIGS. 4-5.—Seals on Tank Fillers.

and with correspondingly greater power." In consequence the Commission Sportive of the A. C. F. has called upon the Commission Technique to formulate plans for the prevention of any possible means of fraud in this direction, and the latter has submitted the devices shown in the accompanying illustrations as effective preventives of the introduction of any supplementary supply of fuel during the course of the race.

(1) All tanks will be provided with a single filling vent of the type already adopted by the Commission Technique and its use will be compulsory on all vehicles. It will be made with a free air vent for gravity fed cars and an air-tight cap for pressure fed systems.

(2) Also of a special design of tank outlet, as per the model already adopted. Each carbureter will be provided with a special type of feed union, and where a carbureter is equipped with a drain cock, it must be disposed in such a manner as to permit of the application of a lead seal. The supply pipe from the tank to the carbureter may be equipped with a filter, but such filter must also be arranged so that all its openings may be sealed. Gravity tanks must not have any other orifice than those above indicated, *i.e.*, filling and feed. Pressure tanks must have but one orifice for the introduction of gas so arranged as to be sealed. Tanks must be made so as to be readily dismounted and must be presented to the commissioners specially appointed to examine them on the eve of the test.

The weight of the tank will be taken both before and after the race, and the commission reserves the right to take apart any tank after the completion of the test. Cars whose tanks do not comply with the foregoing conditions will not be permitted to participate. Entrants may employ whichever fuel best suits them, whether it be gasoline, alcohol, etc. As soon as a tank has been weighed, it will be replaced on the car, and will be supplied immediately after with the quantity of fuel necessary for the entire test. The accompanying line sketches illustrate the means provided to prevent any of the contestants using more fuel than the regulations provide him with. Fig. 1 shows the application of a lead seal to a gasoline filter in the supply line; Fig. 2, the seal as applied to the carbureter inlet; Fig. 3, manner of doing the same to a stop-cock, while Figs. 4 and 5 illustrate gravity and pressure supply openings to the tanks.

### Dismountable Rims Still to the Fore.

Though there has not been much said of the dismountable rim during the past few months, it is evident that attention in this direction has not been lacking. In tackling this problem American inventors have one and all tried to discard the standard clincher type of tire entirely, and many of the devices evolved are not only ingenious, but very practical. Abroad, those who are devoting attention to the subject appear to be working very largely with the clincher tire as a basis. The Shrewsbury and Challiner rim, of which illustrations are shown here, is another instance of this that has recently come to light in England. It consists of a composite rim, says the *Autocar*, with a shallow wooden felloe, surmounted by a flanged steel rim. The flanges on the latter are very deep, so as to compensate for the shallowness of the wooden felloe, giving the wheel much the appearance of one that is solid. As shown, one of the flanges is detachable, so that upon its removal the tire may be drawn off bodily on its own rim. In Fig. 6 the rim is shown dismantled, giving an idea of its components, and also picturing the wooden blocks placed at intervals round the periphery of the felloe to serve as supports between the wheel proper and the rim of the tire which rests upon them. Passing through each of these blocks is a bolt corresponding to a hole in the detachable flange, and securing it in position by nuts when it is on. Both the tire and its rim are of the standard clincher type with the exception of the security bolts, the stems of which are made shorter, though the valve stem is left unaltered, this being made the starting point when placing a tire and the finishing point when removing. The sectional view clearly illustrates the disposition of the various parts when the tire is in place,

FIG. 6.—Details of the new English dismountable rim.

with the exception of the bolts, which pass transversely through the solid flange, wood block and detachable flange, as already mentioned.

### Comparative Strength of Wire and Wood Wheels.

Though it has long been generally recognized that, weight for weight, the wire wheel is greatly the superior of its wooden rival where strength is concerned, just how much more it was

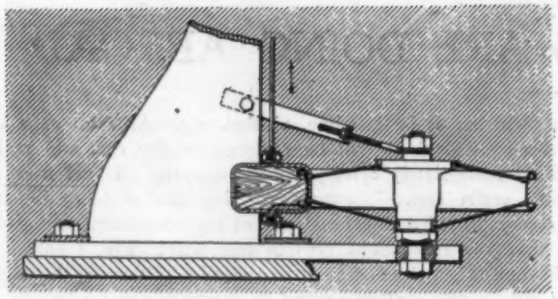


FIG. 7.—Position of wheel in testing machine.

capable of standing than the latter has never been set forth in the shape of comparative data, so that the results of a comprehensive series of tests made in England and brought to light by the *Autocar* are of considerable interest. The wheels are tested in a Denison 6,000 pound tensile testing machine specially equipped for this purpose. The wheel is fitted to a spindle, which is connected to the bed of the machine and rigidly supported at both ends, so that in measuring the deflections of the wheels due to the varying pulls the "give" of the spindle will be eliminated. A block of wood is fitted into the rim and round this a sort of stirrup, the whole apparatus being so proportioned that the pull comes on the wheel at the equivalent of the road line and not at the rim. It will also be noted that the pull is in the same direction as the axis of the wheel, as denoted by the arrow shown alongside the tension strap in the illustration showing the wheel on the machine under test. Fig. 7.

In Fig. 8 a diagram is shown on which curves of the comparative strengths of the two types of wheels have been plotted, the deflection in inches being measured on the horizontal and the pull in pounds on the vertical line. All the wheels tested were quite new, and, owing to the greater rate of deterioration to which wood is subject, it would be necessary to provide a higher factor of safety in the case of the latter to make it equally safe as the wirewheel throughout its existence. This is apparently not done, as none of the heaviest wooden wheels proved to be within five per cent. of the strength of the weakest wire wheels, despite the great difference in weight.

The curves plotted on the diagram in Fig. 9 are based on the same series of experiments as those in Fig. 8, but they have been corrected for weight by dividing the pull by the weight of the wheel. Consequently the vertical measurements to any point on the curve represent the number of times its own weight that is required to cause the wheel in question to deflect an amount represented by the horizontal distance to the same point. For example, the wire wheel deflects 1.48 inch

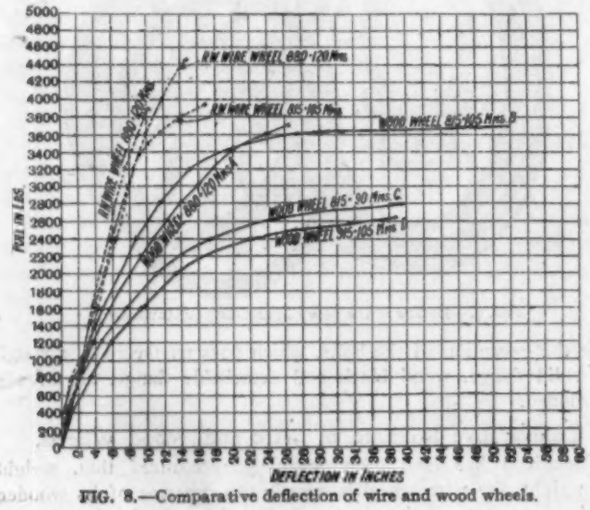

RW WIRE WHEEL 695-120 Mms.
RW WIRE WHEEL 695-105 Mms.
WOOD WHEEL 695-105 Mms. D
WOOD WHEEL 695-90 Mms. C.
WOOD WHEEL 695-105 Mms. B
PULL IN LBS.
DEFLECTION IN INCHES

FIG. 8.—Comparative deflection of wire and wood wheels.

with a load of 185 times its own weight, and the wooden wheel D deflects 3.9 inch with only 63 times its own weight. This diagram further supplies the data necessary for the construction of a wheel that will be the strongest for a given weight. The wire wheels used were made by the Rudge-Whitworth Company, the well-known English makers of bicycles. Of course, there are insuperable objections to the use of the wire wheel on pleasure cars that are so patent as to hardly call for comment, but the data show its great value for racing purposes.

### Preparations for Madrid's First Show.

Up to within the past year or two Spain's progress toward the adoption of the most modern style of locomotion was somewhat on a par with that of the frozen dominions of the Czar. The only Spanish highways are the *carreteros*, or cart roads, that have served from time immemorial as means of communication between the cities, and which are about in the same condition today as they were when Don Quixote rode over them in search of adventure. Few tourists venture over the French border in this direction and those who did found points of supply so few and far between, and the reception accorded them so hostile, that they were not anxious to repeat the experiment. But Spanish royalty has changed all that; it has put such a firm seal of approval on the automobile and everything pertaining to it that there is no alternative left to the population but to do likewise. Hence Spain is shortly to have its first automobile show, and, like all first attempts, it will include exhibits of bicycles and other miscellaneous features somewhat alien to the auto.

The exhibition will be opened on the 4th of May and continue

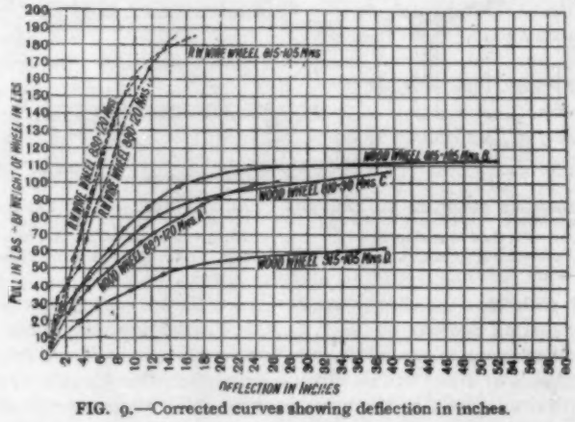

RW WIRE WHEEL 695-105 Mms.
WOOD WHEEL 695-105 Mms. D
WOOD WHEEL 695-90 Mms. C.
WOOD WHEEL 695-105 Mms. B
PULL IN LBS. - BY WEIGHT OF WHEEL IN LBS.
DEFLECTION IN INCHES

FIG. 9.—Corrected curves showing deflection in inches.

for fifteen days, or until May 19. As is natural under the circumstances, the great majority of the exhibits will be by French makers, though in the preliminary list already published there appear a few scattering representatives of the Teutonic and Italian industries. Every inducement is being held out, the Government having accorded the privilege of free entry for all exhibits that are to be returned within three months.

Prominent among the exhibits will be the product of Spain's first automobile factory, La Hispano-Suiza. Some of the well-known Continental makes that will be staged are the Panhard, Dietrich, Berliet, Benz, Delahaye, Brillié and Bianchi. Your true Spaniard moves leisurely, as may be surmised from the following information set forth in the official bulletin of the coming event, and which will be found to contrast somewhat sharply with similar things here, where forty-eight to sixty hours usually represent the maximum permitted the management to install the decorations and the exhibits. Compared with this, exhibitors at the Madrid show will have from April 16 to April 30 to decorate their stands and put the cars in place. On May 1 there will be a meeting of the commission to dispose of stands not occupied up to that date; all to be ready by May 2. Here, twenty-four hours are usually given in which to dismantle the show; exhibitors at Madrid will have to May 29, or eleven days.

# PAST AND FUTURE OF POWER TRACTION ON ROADS*

By the RIGHT HON. SIR. JOHN H. A. MACDONALD, K.C.M.G.

THE marked difference between the people of this country and the people descended from us in the United States is that, whenever an American is presented with a new idea relating to some practical purpose, his whole energy is concentrated on finding out whether he can make it do, and on endeavoring to improve upon it, to make it do still better. We, on the other hand, have a constitutional tendency to try to find out how it will not do, to treat it with suspicion as a new-fangled useless thing, and on the slightest hitch, probably caused by our own want of skill in handling it, to cast it aside as useless. I remember, when a boy, seeing in the first great exhibition, in 1851, two American reaping machines, the first London had ever seen, and which immediately set the fashion of mechanical reaping all over the country. The fact is that the practical part of the machines was not new. A reaper on exactly the same principle was invented by a Forfarshire clergyman so far back as 1822, and was then in use, and had been in successful use for twenty-nine years before Hussey and McCormick were ever heard of. But no one ever thought of following this Forfarshire farmer's example until the reaper came to us as a novel Yankee notion.

Keeping in view this tendency to negative new ideas—to spend energy in finding reasons why they should not succeed rather than to strive to make them successful—it is truly a thing most astonishing that the road power vehicle has made the extraordinary advance which we have seen in the last ten years. The fact that it has done so demonstrates its transcendent potentiality as a practical mode of locomotion. It is true that a fair trial was also refused to it seventy years ago, but this was not brought about by adverse scientific opinion. No scientist spoke against it, and many enthusiastically supported it. The reason why we have not had power vehicles on the road during the six last decades of the nineteenth century is not to be found either in scientific rejection nor in practical demonstration of failure. It stands recorded on the books of Parliament that power traction was at that time a practical success, and the same Blue-book tells of the efforts made to crush it out, which were only too successful. The parliamentary power of the railway interests, and of the peers and squires and farmers, was ruthlessly applied to destroy the new industry from pure selfishness in the former class and crass stupidity in the latter. The railway interest saw in it a dangerous rival, the land interest failed to see its certain benefits to country districts. Short-sighted greed killed power traction by iniquitous tolls and deliberate road outrages, and it was not heard of again until in the early sixties. Thomson drove by steam the first rubber-tired wagon and the first steam rubber-tired omnibus for a short time in the streets of Edinburgh, acting illegally, and, therefore, was very soon made to stop his experiments.

All this makes it the more astonishing that in ten short years since the Act of Parliament which gave permission to vehicles for ordinary purposes moved by mechanical power to use the road, such strides in advance should have been made.

I do not believe that when the little string of cars started for the first joint run to Brighton to celebrate Emancipation Day there was anyone in the procession into whose mind it entered for a moment that that tiny nucleus had in it the germ of the flourishing, well-rooted and fast-growing plant of to-day. Without disparaging that gallant effort of the few plucky pioneers to celebrate the Emancipation Act, there can be no doubt that the 1,000 miles trial of 1900 was the event which first gave a real impetus to motor traction in this country. The Brighton run was the flashing out of the enthusiasm of the few, the 1,000 miles tour was the kindling of the real fire never again to cease glowing—that fire of confident enthusiasm which is irresistible, which then began to flame up vigorously, and is steadily burning its way through the thickets of selfish and prejudiced opposition, which have done their utmost to smother it out. Can anyone doubt that our fate would have been a sad one when Parliament took up the matter in 1903, had the demonstration of 1900 not convinced all but the hopelessly prejudiced that motor traction on roads was a practical and useful advance in locomotion, which, whatever its drawbacks might appear to be, must be accepted as an accomplished fact, and that reasonable regulation, and not repression, was the only statesmanlike course in dealing with it. Many things, of course, happened on that memorable journey which would not happen now. The cars were not—could not be—the steady-going, trustworthy carriages which we enjoy the use of now. There was much that was of the experimental stage about them all, and experience was limited. It was plain to be seen that the problem of convenient road traction by mehcanical means was definitely solved, and that whatever ups and downs might take place in the future, progress to efficiency and to triumph over prejudice were assured. Whether any of us realized that the triumph would come so soon and be so complete I doubt. But this I think I may say for all of us who made the nineteen days round, that we did not feel from the first as if we were making an experiment. We knew that we were demonstrating the existence of a real and practical system of locomotion, the success of which was an accomplished fact, and the predominance of which was an ultimate certainty.

But great as was the success of the 1,000 mile trial, it may well be doubted whether the cars which took part in it had among them as many vehicles as could be counted on the fingers of one hand which would compare, in any reasonable degree, with the touring car of to-day, and there was not among them all one single carriage with a cover. A few had hoods for one seat, but that was all. On the other hand, many of them had excellent engines, of lasting quality. The car in which I rode was still doing work a short time ago, and may be doing good work still.

In order to gain an appreciation of the extent of the recent rapid speed of automobilism in this country, I have made it my practice for the last two years when I happened to be in town to take careful note of the number of power vehicles as compared with those drawn by horse haulage, and the result of many observations is to make it plain that enormous strides have been taken and are still being made from day to day. I shall give you some figures presently, but I wish first to point out that not only is the rapid increase of numbers a cause for wonder, but that something more wonderful has happened. I mean the rapid increase of cars which are built to take the place of the barouche, the landau and the brougham which were our *voitures de luxe* until lately. Whereas in 1900 all the autocars were open pleasure vehicles, a very large proportion now are high-class carriages, which will compare for style and elegance of fitting with the best Laurie and Marners or Morgans of past days. Indeed, one has only to take a walk along Oxford street, or Bond street, or Longacre, to see the coach-builders who cater for what are called carriage people, and who a few years ago would have scouted the idea of allowing an autocar to be seen upon their premises, vieing with one another in display of motor carriages of all descriptions, the cars being placed in front, and the horse carriage relegated to the rear.

But a still more remarkable feature of the development of motor traffic has recently made itself manifest. For a long time it was the common belief that the motor vehicle was the toy of the wealthy sportsman, that its appearance upon the road was only the result of a temporary craze, and that very soon it would lose its attractions as a sport, and would cease to

*Extract from paper read before the Automobile Club of Great Britain and Ireland.

make progress, and ultimately be relegated to special sporting tracks or die out altogether. It is only necessary to observe what is going on to see how absurd any such ideas are. It is becoming more and more clear every day during the last two years that the autocar is no longer the amusement carriage of the leisured, but is becoming the conveyance of the business man.

As regards the future, the business of the hour is not, as I think, the assisting of the trade to show the excellence of their wares or to organize competitions to show what the power vehicle can do as a fast vehicle. It is the commercial vehicle that requires most attention. The business vehicle is now beginning to make its way. It is significant that such a firm as Pickford, who owned the first steam road wagon more than 100 years ago, are doing a tonnage of 480 tons, that another firm is replacing 300 vans by motor vans, that their use by the postoffice is already increasing, and the fire brigade and ambulance services are being rapidly converted. The success of the commercial motor will do much to make the public—ever slow to accept change, however beneficial—begin to take power traction as a matter of course, and when it does this it is only a step further to its being recognized as a benefit. This is already the case as regards the motor omnibus. When the snow was on the ground one read in the newspapers paragraphs such as this, taken from a leading paper: "It will be interesting to see how a motor omnibus will behave when a frost or thaw sets in. There will without doubt be an increased number of casualties with lamp posts in London thoroughfares that are on an incline"; and a picture, intended to be funny, was given of vehicles crashing into standards, smashing into shop windows, and colliding with one another all over the place. The few days which followed this prophecy disclosed the fact that while the electric tramcar and the horsed omnibus had often to give up the struggle against snow and frost, the motor omnibus went gayly and successfully through its work. It will be the same in other departments of commercial transport. The motor vehicle, both for pleasure, for traveling and for commerce, may now be left very much to work out its own way. The real work that is before us is, I suggest, in other directions. The motor for personal and mercantile purposes needs no further nursing. It can take care of itself. The work of the future seems to me to be a work of overcoming the forces which tend still to induce the legislator to think that he is serving the public good and pleasing the crowd by crippling and obstructing progress. Now, what are these forces? There are three, two from external sources and one from within. There is first the bitter and rabid opposition of that large class in this country to whom every change which shakes them out of their groove is intolerable, or, if not intolerable, distasteful. There is, second, the real provocation caused to the non-motorist by the dust on the road being disturbed, to his discomfort. There is, third, the enemy who, to our shame, is of ourselves—the inconsiderate and sometimes even blackguard motorist, and he is the very worst enemy we have.

Fast mail coaches were to ruin the country and cause physical breakdown. Railroad traveling was to destroy our nerves and cram our asylums, and shorten the average life, which has been going up for the last seventy years. The railway train was to deprive our children of sustenance by making the cows withhold their milk. Cycling was producing a haggard, mentally diseased look on our faces. Now we motorists in our turn are told that motoring is attacking our spines, ruining our nerves, breaking down our health, and hurrying us to the madhouse. Yet here we are, like the jackdaw of Rheims, we are under the curse, but strange to relate we are nothing worse.

Well, we may laugh at these extravagances, but they have their serious aspect. They tell of a deep-seated enmity to our cause, the more virulent, because unreasoning. It must be met as if it was serious, and resolutely combated by vigorous argument and refutation, and for this all who have the cause at heart should arm themselves with facts and illustrations and press them in society on every occasion when it is discreet to do so. We must show that we are rationally serious, and not to be put down by strong adjectives or blatant prophecies.

The second point as regards the future is the dust question, which is of all the most important and the most dominating, because it is one as to which complaint is justified. Even when driving is considerate, the evil of dust is still not trivial, and when the road cad is about it is not only objectionable but intolerable. I have seen a car approach and go past without slackening speed in the least, thick clouds flying out right across the road, like the smoke from a double broadside of quick-firing guns, compelling every other vehicle to come to a dead stop for minutes, it being impossible to see at all. I have even seen this done by distinguished members of this club, in the exuberance of their salad days as motorists. I believe if they look back now they will be contrite. Such conduct to those on foot or wheel, and to residents on the road, is as unworthy of good sportsmanship as it would be to force horses at a gallop through a crowded market place.

But the dust is objectionable even where the driving is considerate. The old mail coach raised dust terribly, but the crowd of auto cars makes it worse. Therefore, there can be no doubt that the repression of dust is a great question of the hour. That the roads can be brought into a practically dustless condition is, I think, certain. Experiment has proved this conclusively. All must rejoice to know that this matter is being taken up by a special committee representing all classes of interests, and that the feeling is growing that Government care of the roads and Government aid are the true means of solution of the problem.

The last enemy with whom we have to contend is the most deadly enemy of all—the foe of our own household—the inconsiderate driver, to whom allusion has already been made in speaking of the dust question. The man who holds the crown of the road, drives others to the ditch, bespatters them with mud or chokes them with dust, and dashes through villages, hoots his way past the church where worship is going on, can do more in one day to cause all motorists to be hated than all the considerate drivers can do in the way of conciliation in a month.

Let it be borne in mind that the man in the street is not a particularly observant animal. He too often sees through the grim spectacles of prejudice, put on his nose by others, and resists as long as he can the clear light of the logic of facts.

> "The text that suits not with his darling whim,
> Though plain to others, is obscure to him."

Let it be remembered that one of the reasons why every energy should be put out to counteract opposition is that much of that opposition is not reasonable, but wildly unreasoning, and because it so is much more difficult to meet. The knowledge that an opponent is actuated by passion rather than reason leads too often to an unwise complacency—the foolish belief that because you have reason on your side you may let things take their course. This is a mistake in every case, and in this case it would be a fatal mistake. Every energy must be put out to allay passion and to convince reason.

The purposes of this paper will have been served if I have been able to supply my audience with facts or arguments which they may use, and which I trust they will use, to create enthusiasm and activity among our friends, to win over the indifferent and the opposing, and to convince the implacable that it is vain to attempt to crush, and wise for them to be moderate, and so to win the good will of all the considerate among motorists, and their assistance in putting down those who, though motorists in one sense, are the worst foes of automobilism—the scorcher and the hooligan of the road; and in providing a road which will be free of mud in winter and of dust in summer.

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**An omnibus** has been delivered at Tokio, where it awakened much curiosity, which could only be slaked by an immediate initiation into the sensation of riding in this European conveyance.

# A NEW FRENCH RECRUIT TO THE TWO-CYCLE*

FRANCE has found herself in somewhat the same anomalous position that has existed for so long in this country, in that but one prominent firm has devoted itself to the building of motors of the two-cycle type for automobile use. There is now, however, a new entrant into this field abroad in the shape of the *Dubois et Uzac* car, which is of considerable interest from the fact that its builders have departed considerably from the beaten path in the design of their motor, though the latter is laid down along lines somewhat similar to those employed in the Wolverine and Smalley motors, both of American make. Neither the crankcase compression nor the auxiliary external pump types have been followed, the initial pressure necessary to deliver the fresh charge to the combustion chamber being obtained by the use of a differential piston, which differs considerably in detail, however, from others of this type that have been built previously. This consists in the main of a central stationary tube provided with gas tight rings the same as the piston. Through this tube the connecting rod works the same as in the ordinary two or four-cycle motor. This tube is designated in the accompanying sectional elevation of the motor by the letter *F*. The piston itself is of the ordinary type so far as its upper part is concerned, but is of unusual length and at its lower end carries a collar or second annular piston *B*, also provided with a ring. As will be plain from the drawing, the piston bears externally against the cylinder wall and internally against the tube *F*. The latter, together with the outer wall of the motor, forms an annular chamber in which the piston *B* works.

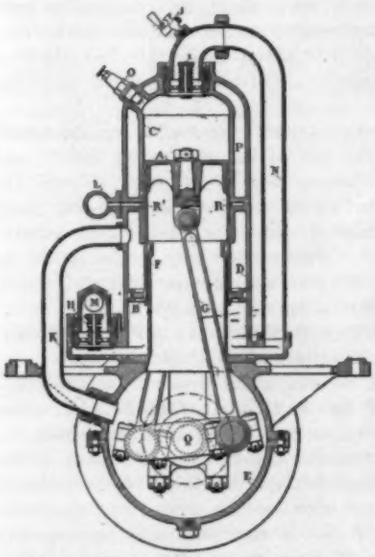


FIG. 1.—Sectional elevation Dubois motor.

### Great Economy in Fuel Consumption.

According to the builders this arrangement results in the reduction of the friction to a minimum and no leakage is possible. A model motor built on this system, having a bore and stroke of 90 mm. (3 1-2 by 3 1-2 inches), installed in a 25-foot motor boat, weighing, with ten passengers aboard, in the neighborhood of 1,500 kilos (3,300 pounds), drove it at an average speed of 13 kilometers, or approximately eight miles an hour, on a consumption of but two liters per hour, or little less than half a gallon. During the course of the past year the same boat has covered 5,000 kilometers without any engine troubles. On a four-cylinder car rated at 30 horsepower, the cylinders of which measure approximately 4 1-4 by 4 1-2 inches, it was never found necessary to provide more than 16 liters per 100 kilometers, or about 3 1-2 gallons for 65 miles. A means of readily reversing the engine by means of the ignition, through a special system of wiring upon which the builders hold patents both in France and abroad, makes the motor particularly convenient for marine use.

The advantages of the motor will be more clear from a description of its construction and method of operation. Referring to the sectional elevation, Fig. 1, it will be seen that the cylinder is water-jacketed about the combustion chamber, the jacket *P* only covering the upper part of the cylinder. The lower portion of the cylinder is bored concentrically with the combustion chamber, its diameter being half again as large as the latter. In this double cylinder the pistons *A* and *B*, which are in one piece, move in the chambers *C* and *D* and are attached to the connecting rod *G*, while *Q* and *E* represent the crankshaft and crankcase respectively. The latter carries the central tube *F*, which is provided with piston rings at its upper end, while at its lower end it is made somewhat bell-mouthed to clear the connecting rod and is provided with an extension base by means of which it is fastened to the crankcase.

### Details of Motor Construction.

In the head of the cylinder *C* there is inserted an automatic inlet valve *I*, while the lower cylinder *D* is provided with a second inlet valve of the same type communicating with the carbureter. The pipe *N* connects the cylinder *D* with the combustion chamber *C* through the medium of the first inlet valve mentioned, while the exhaust gases escape from the cylinder through the ports *RR* and the pipe *L*. At its upper end the cylinder *D* is provided with an opening which communicates with the crankcase through the medium of the pipe *K*. The cylinders *CD* are cast integral with their base, the same as the central tube *F*, which permits of the ready mounting of the whole on the crankcase by means of gudgeon pins and screws. The remainder of the details of the construction will be plain from the cross sectional view which has been referred to in the course of the above description.

The sequence of the various functions in the cycle of the motor are as follows: Assuming the pistons to be at the lower end of their stroke, and the combustion chamber *C* full of fresh gas, the piston *A* on its upward stroke will compress the gas and at the same time the lower piston *B* will aspire another fresh charge into the chamber formed by the wall *D* and the central tube *F*, through the valve *H*, which, owing to the depression produced by the upward travel of this piston, remains open during the entire stroke. At the end of the latter the charge is fired, the spark plug *O* being located near the inlet valve and placed at an angle. On the downward or power stroke, the fresh charge which has just been drawn into *D* is compressed by the piston *B* until the piston *A* reaches the end of its stroke, uncovering the exhaust ports *RR*, permitting the escape of the burned charge. The depression caused by the latter then causes the inlet valve *I*, in the head of the cylinder, to open and a fresh charge passes into the combustion chamber, aiding in the expulsion of the exhaust gases. This remains open for a considerable portion of the upward stroke of the piston *A*, or until the compression of the charge overcomes

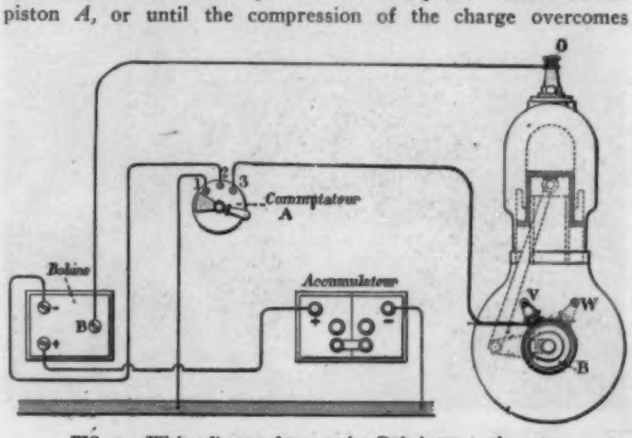



FIG. 2.—Wiring diagram for reversing Dubois two-cycle motor.

*Translation from *L'Automobile*, by Charles B. Hayward.

the pressure on the other side of the valve. During this operation the cylinder *D* has again been replenished through *H*. The volume of *D* is slightly greater than that of *C* and the compression created by the piston *B* is calculated to insure a fresh charge sufficient to fill *C*. The speed and power are varied by throttling the mixture at the carbureter and advancing or retarding the point of ignition. If the ignition should be cut off when the motor is running, it will come to a stop after several revolutions, but, as has already been made plain, the charges under the initial compression given them in the cylinder *D* are conducted to *C* through *N* and are there recompressed prior to ignition. It is evident that the motor cannot come to a halt until the pressures in *C* and *D* reach a point of equilibrium, and at that moment the pistons must always be half way up or down in the course of their stroke, a position horizontal to the axis of the motor, the balance of the pistons and cranks aiding in this result. From this it will be apparent that the motor can never come to a stop on a dead center, and by means of a special form of commutator the motor is made self-starting in either direction.

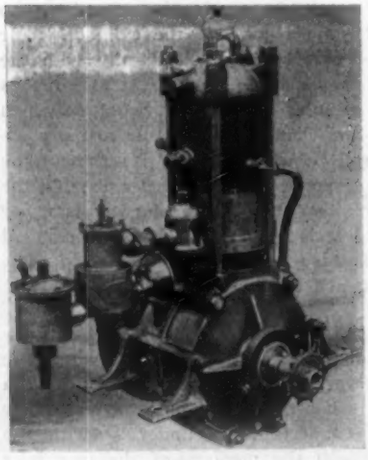


FIG. 3.—Nine horsepower marine motor.

### Details of the Ignition System.

The high-tension system of ignition is employed, the spark plug *O* is connected to the positive pole of the secondary winding of the coil, the other being grounded, while the positive terminal of the accumulator is connected to the positive end of the primary winding and the other side—the negative of the accumulator—is grounded. The switch *A*, shown in Fig. 2, is provided with three points, number one being grounded, number two to terminal of the induction coil, and number three to the timer *B* on the motor, the switch lever being designed to cover two of the points at once. For instance, the motor has stopped with crank to the left of the axis of the motor, and it is desired to start on the reverse—that is, from right to left. The timer *B* on the motor is turned to the position *V*, a point corresponding to that of maximum retardation on the reverse, and at the same time the switch lever of *A* is turned to cover two and three. The first explosion suffices to start the mixture flowing through *N* and it is then only necessary to alter the speed by advancing the spark or opening the throttle. To cite another example, let it be assumed that the motor has stopped in the same position as above mentioned, and it is desired to start it running ahead—that is, from left to right. The timer is then placed in the position *W*, corresponding to the point of maximum retardation when running ahead or normally. The switch lever is turned to cover the points 1 and 2. The first stroke will be in the reverse direction and immediately after its occurrence the switch is moved to cover the points 2 and 3, and as the next charge sent into the cylinder through *N* cannot be fired until contact is made at *B*, this causes the next stroke to occur in the opposite direction and the motor then takes up its cycle, regularly running forward. To speed up the motor it is only necessary to advance the spark as in the former instance.

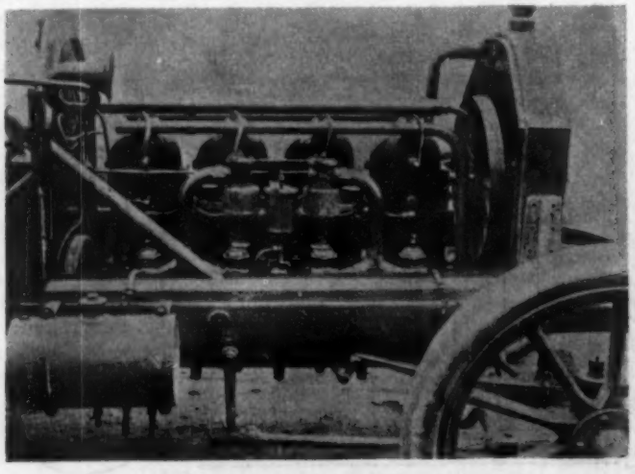


FIG. 4.—Carbureter side, four-cylinder motor on car.

These two examples demonstrate that, whether the crank stops to the right or to the left of the axis of the motor, and as already mentioned it cannot stop at any other points, the motor can be started ahead or on the reverse simply by shifting the position of the timer *B* and the closing of the primary circuit by the switch *A*. When under way, contrary to the method used in starting, the reverse is obtained simply by cutting out the ignition momentarily and then giving it an excessive advance, which causes a premature explosion and starts the motor in the opposite direction, after which the timer is immediately returned to the running point desired.

Lubrication is provided for as follows: The tube *K* unites the crankcase *E* with the upper part of the cylinder *D*. In the part of the cylinder in question a depression is produced by the descent of the piston *B*, and this space is filled by the pressure created in the opposite direction by the descent of the same piston in the crankcase. The big end and main bearings are lubricated by the splash of the oil in the bottom of the crankcase and the circulation of air set up by the means just described suffices to carry considerable of the oil up into the chamber *D*, effectively oiling the pistons *A* and *B*. This system is necessarily proportioned to the speed of the motor and ceases immediately the latter stops. The level of the oil in the crankcase is maintained constant by a float-feed placed in the supply pipe. There seems to be little doubt that the attention of a few large manufacturers on the Continent, if devoted to the development of the two-cycle motor with the success that has apparently rewarded the inventor's efforts in this case, would be of far-reaching benefit to the automobile industry the world over. Particularly where the French industry is concerned, the two-cycle type of motor appears to have suffered more from inattention than anything else—neglect, it might be called.

## "ELECTRICITY ONLY WARMS THE BIRD'S FEET."

Every now and again the "automobile reporter" of some daily is assigned to cover an accident or an interview and the way he dishes it up is something to make the informer's hair stand straight on end. Two of New York's leading and most respected dailies in the course of the description of an accident that was accorded a top of column, front page position, with display head, and in which an elderly woman had been run down by an auto on Broadway, made the statement that her clothes had caught fire from "hot coals dropping from the carbureter." Of much more recent occurrence is the deviation from the straight path of technical rectitude of that scribe who quoted a well-known designer as saying that "the piston rod of a gas engine worked up and down in the cylinder, accelerated by the explosions in the carbureter, which was the reason why the stroke could not be made longer." These and their kind are certainly diverting and seldom do any harm, but such can hardly be said of the break of the editor of an automobile paper, who, in answering an inquiry as to why birds alighting on electric wires were not killed by the current, naïvely stated that the "electricity only warmed their feet."

# LETTERS INTERESTING AND INSTRUCTIVE

## The Noise Made by Valves.

Editor THE AUTOMOBILE:

[657.]—I have a four-cylinder touring car, of 24-horsepower, which seems to me to have very noisy valves. The car is a 1907 model, and with this exception runs as quietly as an electric. The muffling is beyond criticism, there is no perceptible noise from the gears, and the squeaking and creaking that accompanies the progress of so many cars is entirely absent. But the valves keep up a most interminable clacking—perhaps no worse than with other cars, but made more pronounced by the absence of other noises—and if it is possible I would like to remedy this defect, to which end I will be pleased to receive any suggestions you or your readers may have to offer. Is there anything about the valve seatings, the amount of lift, or the adjustment or form of cams that change the conditions so that less noise will be made?

Denver, Colo. DR. B. A. PEABODY.

Ordinary poppet valves are perhaps the most difficult detail involved in the mechanism of a modern high-grade car to make very silent. The very nature of their operation, requiring sudden lifting and a return to a metal seat, makes it impossible to expect an absolute elimination of noise from such sudden clashing of metal-to-metal surfaces. Much can be done, however, in the design of an engine, to reduce the noise by a judicious proportioning of valve lifts and diameters. The present prevalence towards valves of large diameter and very slight lift is an expression of this tendency. Also, valves with flat instead of beveled or mitered seats are coming widely into use because they afford a given opening with the least lift. The objection to valves of large area, especially exhaust valves, is that they require proportionately heavier and more durable cam mechanism to open them against the residual pressures within the cylinders, without entailing undue wear. A further objection, from your particular standpoint, is that the design of your motor is likely to be such that any increase in valve diameters is likely to prove exceedingly expensive, if not absolutely impracticable. Reduction of the lift is less difficult, but should not be done unless you can change to flat seats. Possibly your trouble may be due to an often-neglected detail of cam design—the form of the closing contour. If this is too abrupt, the closing means may snap the valve to its seat much quicker than is desirable. Sometimes changes in the exhaust or intake piping will reduce valve noise. Aluminum intake manifolds are especially apt to possess a certain resonance which seems almost to magnify small noises, while the presence of small openings in intake manifolds is another cause of noise escaping, which otherwise might be very effectively smothered.

## No Symptoms from Which to Make Diagnosis.

Editor THE AUTOMOBILE:

[658.]—Will you kindly answer the following through the columns of your journal?

Can you inform me how I can get more power out of my single-cylinder car? The engine seems to work all right, and also the spark coil and plug, yet it does not seem to develop the power it is rated, which is four horsepower. It seems to be all it can do to climb a 5 per cent. hill. H. N. F. C.

Meshoppen, Pa.

Without knowing anything further than the meagre account that you give in your letter, it is next to impossible to state with any degree of certainty just why your motor does not develop a greater amount of power. There are several things that may be wrong. The valves may need regrinding or the piston rings replacing, or again the only trouble may be that one of the brakes on the car is dragging. The mere fact that the engine apparently runs all right is an indication of nothing more than that it is not deranged to the extent of preventing its operation. Under such circumstances the compression would naturally seem to be the first thing to investigate, as, if it be efficient in this respect and responds readily to the spark and throttle, there is no reason why it should not develop its full rated output.

## Vibrators in Vacuo.

Editor THE AUTOMOBILE:

[659.]—Why would it not be a good idea, in the attempt to refine ignition systems to a maximum of efficiency and reliability, to seal the vibrators in exhausted glass bulbs, within which they would be protected from most of the troubles that now cause their uncertain working? The use of a vacuum in this way would prevent the corrosion between contact points, which is due to the oxidizing effect of the air, and would do away with the mechanical lag of setting the vibrator in motion, which is principally because of the air resistance. There would be no possibility of changing the adjustment, but this would be an advantage rather than an objection, because a proper adjustment could be made beforehand, and afterwards this adjustment could not change because of the complete protection from disturbing factors.

Hagerstown, Md. HOWARD CUSHMAN.

While the plan you suggest might prove to have some advantages, it is very doubtful if they would be exactly as you state them. In the first place, the "corrosion" you refer to is not so much corrosion as it is an actual fusing away of minute particles of the contact points—an action that would continue to take place in a vacuum about as readily as in air. This effect, therefore, would sooner or later disturb the adjustment, just as it does now, making readjustment, through some ready provision for it, imperative. And if such a necessity arose, as it undoubtedly would, it is not likely that the average motorist would be inclined to enthuse over a construction that placed all means of adjustment absolutely out of his reach. As for the lag, this certainly is attributable almost solely to the inertia of the vibrator blade, for the amplitude of the vibration is too small to make air resistance a serious factor, except as it may possibly prevent, after the movement is under way, as rapid a vibration as might be produced in a vacuum. In connection with certain automatic-telegraph experiments, as well as in some "seeing-by-wire" devices, we believe the vacuum-surrounded vibrator has been utilized to some extent.

## Positive Functioning Under Throttled Condition.

Editor THE AUTOMOBILE:

[660.]—What is the degree of compression, in pounds per square inch, now most preferred in automobile engines? Is it not a fact that most automobiles are much overpowered, with the result that normally the engines work under considerable throttling? And if the foregoing is a fair statement of the case, what becomes of the advantages of compression when only a comparatively small charge is inspired, with the result that the compression is lowered in proportion? CHAS. M. ENGELHARDT.

Springfield, Mass.

Your questions all strike at what is a widely-admitted fault of modern internal-combustion engines. No mechanism is perfect, and the variable compression with variable throttling, which is a feature of current gasoline-motor practise, perhaps may be regarded as an imperfection. On the other hand, the system used with the Adams-Farwell car, of deliberately varying the compression by inspiring full charges and afterwards blowing out a proportion of each, might be held to support a contrary view, since it is used very successfully. Nevertheless, there is no question about the facts as you state them. Experience has proved it expedient to propel cars by very powerful motors, capable of making good speed up the worst hills and over the hardest going. The unavoidable result is that under less strenuous conditions only a fraction of the maximum power available is required, and, therefore, with the best-established means of control over power output, the compression must be diminished by the wire-drawing consequent upon throttling. One well-known American engineer—the designer of a foremost American car—recently patented a system of control providing constant compression through the use of air volumes, containing no fuel, introduced within the cylinder but kept separate

from the throttled charge by an application of the principle of stratification. All of this, of course, applies specifically to the four-cycle engine. With two-cycle engines practically constant compression is maintained, because, under throttling, in proportion as less charge is admitted more exhaust is retained, the result being a practically invariable total. The real gain is less than might appear, however, since the mixture is exceedingly adulterated and impoverished. For example, if the charge is throttled to one-sixth of its maximum volume, and contains one-tenth part of gasoline vapor (both usual figures), the effect upon the cylinder contents is best expressed in the fact that they then consist of one volume of gasoline vapor, nine volumes of air and fifty volumes of inert gases—incidentally proving that mixtures very much leaner than are commonly approved can be used with a high degree of success.

### "Starting on Compression" Again.

Editor THE AUTOMOBILE:

[661.]—Some weeks ago, the statement appeared in your paper, in an answer to one of your correspondents, that an automobile engine would not "hold compression," and that when an engine started by the spark it did so by the explosion of "uncompressed mixture." If this is true, and uncompressed mixture will give such a powerful impulse, why are engines not made to run without compression? It seems to me that it is one thing to sit in an office and undertake to give right answers to every question that anyone can ask, but it is quite another to get practical experience by running cars, which is the only real way to know what we are talking about. M. A. MULLINS.

Reading, Pa.

Your outspoken skepticism concerning the authority of our answer to a certain question apparently fails to take into account the fact that there are thousands of internal-combustion engines to-day in use which run altogether without compression. An engine cycle in which compresison is not used will fail to give as high explosion pressure or as great efficiency as when compression is used, but as far as mere working is concerned it works very well. So you may regard it as well established that an uncompressed mixture will upon ignition give an impulse amply powerful to turn over an automobile engine declutched from the driving mechanism. As for our presumption in undertaking to give right answers to every question that any one can ask, if you will refer to your files of THE AUTOMOBILE and glance back over the correspondence columns you will find that we have not infrequently failed to give satisfactory answers, apparently because we are no more infallible than you seem to regard us. We are always pleased to hear from a reader who can explain something better than we can ourselves. We have, however, access to a few cars from which we occasionally gain a little practical experience. Because of this we know that if you have a car that starts from a spark it will also start equally well if you first open the petcocks and absolutely relieve every trace of residual compression. Try it and see.

### Some Ignition and Carburetion Queries.

Editor THE AUTOMOBILE:

[662.]—I have a few questions that I would like to have answered, if it is not too much trouble: (1) How high a battery voltage would a Pittsfield quad coil stand without danger of burning? (2) Will an ordinary carbureter carburet kerosene without a heating jacket? (3) Has anyone ever equipped a car with two fuel tanks, one for gasoline and one for kerosene, using the gasoline to start the motor and kerosene to run on after the motor is warmed up? (4) I have seen porcelain spark plugs chipped and broken at the hot end. Now, it seems to me that the pieces of porcelain must have been hammered to pieces by piston. Now, if such be the case, are they likely to do serious damage to the motor?

Moline, Mich. A SUBSCRIBER.

(1) Not knowing exactly the amount and size of the wire used on the coils you mention, we cannot accurately state the potential that they will stand without a breakdown in the insulation, commonly known as burning out. Coils for ignition purposes, however, are generally wound to take current at a potential of six volts, and anything over this is not advisable. Of course, all coils have a factor of safety and are capable of standing an overload, which is what subjecting them to a higher voltage than they are designed for amounts to, and the proportion that this factor of safety bears to the normal capacity of the coil represents the limit to which the potential may be increased without damaging it, assuming meanwhile that the amount of current remains the same, only the voltage being increased. For instance, a six-volt coil with a factor of safety of 100 per cent. would be capable of standing a potential of twelve volts. This matter was discussed somewhat at length under the caption of "Increasing the Dose Is Apt to Be Dangerous," which appeared in the issue of January 24, 1907, of THE AUTOMOBILE.

(2) It will if it can be maintained at the proper temperature by some other means, as a much greater amount of heat is required to properly vaporize kerosene than lighter fuels, regardless of the manner in which it is applied

(3) We have come across instances of this kind from time to time in looking through foreign automobile periodicals, but do not know of any cases where it has been done on this side of the Atlantic. In one of the cases referred to, a Scotch motorist gave his experience with kerosene over a period of two or three years.

(4) The plugs have not been "hammered" to pieces by the pistons, as you surmise, but have succumbed to the intense heat and vibration. The porcelain of which the insulating core of a spark plug is made is an abrasive and if it managed to get in between the piston and the cylinder walls, as would most likely be the case in a vertical engine, it would do damage. We should think, however, that the particles would be of such small size as to be blown out the exhaust in the great majority of cases.

### Direct Current Dynamo for Ignition.

Editor THE AUTOMOBILE:

[663.]—Will you be good enough to answer a question through the columns of your journal, which we read with increasing interest in each number. We have a single cylinder car that we use in connection with our business, and we find trouble in getting good dry batteries; they soon run down and are not dependable; we are a long distance from factories and any headquarters for motor supplies, and suspect that most of the batteries we get are old.

Can we put an Apple, or other make of dynamo on our car, run it by friction from the flywheel, and get what current we need without the use of dry batteries or any other form of stored current? We saw in a recent issue of "The Automobile" where a subscriber had used one on an Elmore car with good success. Is such a a scheme practicable, and, if so, please give directions how to connect same, and if practicable, why are they not generally used on all cars? What are the faults? If the scheme is all right, please give size or number of dynamo required and address of concern manufacturing same. SINGLE CYLINDER.

Charlottetown, P. E. I.

Small direct current dynamos such as you mention are largely used and are usually driven by friction from the periphery of the flywheel, so that there is no reason why you cannot successfully apply such a system to your car. In earlier days, the principal faults with the small dynamo were its small capacity, *i.e.*, current output, and the crude type of governor used, which frequently failed to work and caused the dynamo to burn out when the engine raced. We believe these faults have been entirely overcome long since. Regarding size required and details of installation, we prefer to refer you to the makers, whose announcement you will find in our advertising columns.

### Advantages of Offsetting the Cylinders.

Editor THE AUTOMOBILE:

[664.]—Will you be kind enough please to give me some information in regard to the advantages and the disadvantages of offset cylinders. I am constructing an engine 4 3-4 by 5 1-2, and am interested whether or not to set off the cylinders 7-8 inch. Knowing that you are in a position to furnish direct and intelligent information on a subject of this kind, I take this means of requesting same. R. W. BLAKE.

Bryn Mawr, Pa.

The question of offsetting the cylinders on the crankshaft is not a new one by any means, though many are under the impression that it is something that is the outgrowth of the development of the internal combustion motor; but such is not the case, as it was used on old-time single-acting steam engines many years ago. As is well known, the internal combustion motor, particularly as employed on the automobile and in the motor boat, does practically all its work on one stroke. The exhaust stroke is an idle one and on the compression stroke comparatively little work is done, so that the side-thrust of the piston against the cylinder wall, due to the angularity necessitated by the use of a short stroke and connecting rod, is concentrated on the power stroke. To overcome this, a great many makers have adopted the plan of offsetting the cylinders. The amount to which this should be done in order to gain the greatest advantage will be found at a point where the thrust is lessened to the greatest degree on the power stroke and at the same time not increased excessively on the compression stroke, otherwise the desired advantage is apt to be lost due to the thrust set up by the excessive angularity of the connecting rod on the latter.

The offsetting is usually calculated with reference to the length of the stroke and varies from 10 to 25 per cent., although in the case of the Armstrong marine motor, which is an extreme, the offset given is the equivalent of the length of the crankthrow. The Duryea motor—the first of its kind in this country—is offset 3-4 inch in 5, or 15 per cent.; in the Moore but 3-8 inch offset is given, while in the Craig-Toledo it is 1 1-4 in 5, or 25 per cent. The Rambler closely approaches this, but the same effect is obtained by offsetting the connecting rod on the piston, instead of altering the relative positions of the cylinders and crankcase. The actual amount given is 1 1-8 inches in 5 1-2, or 20 per cent. In the case of the American Mors it is 1 inch in 6, or slightly over 16 per cent. Other American makers who have adopted the principle are the Winton, Aerocar, Berkshire, Frayer-Miller, American, St. Louis, Frontenac, Simplicity, American motor truck, Dolson and Austin.

### Compression Data and High-Speed Engines.

Editor THE AUTOMOBILE:

[665.]—I would like to have you answer the following questions through the columns of your paper. In speaking of compression I mean the difference due to design, and not to leaks of any kind.

(1) Does the speed of an engine vary when the compression is changed, or what effect does increasing the compression have on the speed, other things being equal?

(2) If the speed of an engine varies with the compression, in what ratio does it vary?

(3) Principally, how does a high-speed engine differ from a low-speed engine.

(4) Why will not a high-speed engine work well at a low speed?

(5) If an engine with large valves and high compression will work at high speed, will same work well at low speed if compression is lowered?

(6) What is the average compression used on American road machines and that on track machines; that is, pressure in pounds and percentage of compression space?

(7) Can you tell me where I can obtain books on gasoline engine design that will give all formulas, etc., for automobile engine design? A. H. CAIN.

Roodhouse, Ill.

(1) It does. The speed is increased.

(2) This is somewhat of a poser to answer offhand. We cannot enlighten you as to exactly what relation the compression bears to the speed. Probably some of our subscribers who are more conversant with the subject will come to the rescue. Hiscox gives a table of data showing a comparison of the theoretical and actual efficiencies of a four-cycle gas engine with varying compression and also a table of compression pressures and clearance ratios, but so far as known there are no data extant in the shape of a compression and speed table.

(3) The chief difference between the design of a high-speed and low-speed engine is to be found in the length of the stroke.

(4) Principally because, at a low speed, it is only receiving a fraction of the impulses per minute that it was designed to receive. This on the presumption that by working well you mean delivering a proportionate part of its rated output at a low speed.

(5) It will probably work satisfactorily for all ordinary purposes, though such a radical change in the design is apt to be detrimental to its efficiency.

(6) Doubtless 60 to 70 pounds represents a close approximation to the average compression of American cars, with a slight increase in the case of specially designed racing machines. It is customary to make the compression space 25 to 33 1-3 per cent. of the volume displaced by the piston, these figures probably representing the two extremes of current practise, so that something like 29 to 30 per cent. might be considered a fair average.

(7) We have sent you a catalogue under separate cover.

### Probable Life of the Ignition Magneto.

Editor THE AUTOMOBILE:

[666.]—Will you kindly tell me through your question department whether or not a magneto will generate a magnetic current indefinitely. If not, what time would be its probable life if used on an automobile? You will geatly oblige. C. F. NIXON.

Leominster, Mass.

We presume your question is as to the probable life of the magnets—in other words, how long will the magnetic field of a magneto retain its strength?—for as soon as the latter fails the machine will no longer generate a current when run. A magneto generates an alternating electric current as ordinarily constituted, or a direct current when equipped with a commutator. The word current is not ordinarily used in connection with magnetism. No magnet will retain its strength indefinitely, but we have known magnetos of the class used on telephones, which are practically the same as those used for low tension ignition, barring their smaller size, to be apparently as strong as ever after fifteen or sixteen years of constant service. Heat and vibration are both detrimental to magnetism, but the chief cause of its loss is the removal of the armature from between the pole pieces, leaving the magnets stand in this condition. There has been a vast amount of misconception on this point, where the automobile magneto is concerned, and much of it still exists. Popular knowledge as to the essentials of the magneto is so scant and usually so erroneous that the failure of the magneto to work from almost any old cause has usually been put down to a failure of the field magnets. We have known of one or two instances where an autoist has returned his magneto to the maker with instructions to remagnetize the field, as it had become weak, when nothing but cleaning or a little adjustment was required. As the maker does not go to the trouble to disillusionize the customer, the latter thinks he has successfully diagnosed the trouble and leads others to think likewise. No instance has ever come to our knowledge where a properly constructed and cared for magneto has lost its magnetism to an extent sufficient to interfere with its working. We should say the magnets were good for eight to ten years at the least; remagnetization can be done in a few minutes at a cost of a dollar or less.

### Influence of Auxiliary Exhaust on Inlet Valve.

Editor THE AUTOMOBILE:

[667.]—I have a four-cylinder 1904 car, and last year bought new cylinders and necessary parts for the auxiliary exhaust. After fitting these carefully, I could never get more than half the power out of the engine, but after cutting out the auxiliary exhaust the car worked as good as it ever did.

The makers of the car insisted that the engine was not properly adjusted or it would work with the auxiliary, and asked to have the car brought to the factory. This I did, and after a week or ten days' testing and adjusting, decided that it would not work with the auxiliary on account of the automatic intake—consequently the auxiliary was cut out permanently for the season.

Now I can't understand what the automatic intake has to do with the auxiliary exhaust, which is fitted with check valves. Perhaps some of your subscribers can explain. I will now fit my engine with the mechanical intake, hoping that the results will be satisfactory. Any information on the subject will be appreciated.

Watertown, N. Y. C. D. W.

We are not sufficiently familiar with the design of your car, particularly in its rebuilt condition, to be able to throw much light on the matter regarding which you inquire. On general principles, however, we should say that in all probability the reason why the auxiliary exhaust deranges the working of the automatic inlet valve is to be found in the fact that the former tends to equalize the pressure in the cylinder with that of the atmosphere at the end of the exhaust phase, thus preventing the formation of a vacuum in the cylinder and in consequence the working of the inlet, which depends upon this. If there is an appreciable difference between the pressure in the cylinder and that of the atmosphere the inlet valve is bound to open on the suction stroke, unless prevented by too stiff a spring, or similar cause, which we presume is hardly likely to exist in view of the investigation you mention. We have no doubt that the fitting of mechanically operated valves will entirely eradicate the trouble.

### A Criticism of No. 585 from Abroad.

Editor THE AUTOMOBILE:

[668.]—Your interesting paper reaches me regularly, and I am much interested in its contents. In looking through the issue of February 21, you have under the heading, "A Twenty-five Per Cent. Grade About the Limit," an inquiry, No. 585, to which you

WINTON CLIMBING ONE-IN-FOUR GRADE AT PRESTON, ENG.

reply stating certain facts as to the hill-climbing power of automobiles. It is dealing with this heading that I should like to call your attention to the illustration on page 31 of the accompanying catalogue, together with a surveyor's certificate of the gradient up which the car is pictured climbing. The surface of this hill, as can be seen by the illustration, is exceedingly bad, but, in spite of this, the Winton Model "K" had no difficulty whatever in negotiating it. If you think the matter of sufficient interest to your readers, you can make what use of it you like.

You may have a representative over here on a trip shortly, and I shall be glad to meet him and show him the fine premises owned by the Winton Motor Carriage Company in London, where they possess a floor space of no less than 13,000 square feet on one of the main arteries of London.

W. L. DUCK, Mgr.,
WINTON MOTOR CARRIAGE COMPANY.

London, S. W., Eng.

The surveyor's certificate mentioned is to the effect that the hill in question is 495 feet long and on the first hundred feet has a rise or inclination of one in six, while on the last 150 feet, which is the steepest part of the hill, the rise is one in four.

### A Simple Method of Figuring Horsepower.

Editor THE AUTOMOBILE:

[669.]—Referring to Letter No. 600, under the head of "Data Wanted on Engine Testing," I have a simple and practical formula or method of computing brake horsepower taken from about 100 brake tests of different makers and dimensions. It is horsepower equals total volume in cubic inches per minute divided by 5,000.; or, formula equals V.P.M.C" divided by 5,000.; or total volume per hour in cubic feet divided by 173.7 equals horsepower. Formula equals $\frac{T.\ VP\ H}{173.7}$ equals horsepower.

I will forward the details of these results of figures if you wish them.

R. C. MATLACK.

Chicago, Ill.

We have no doubt that the figures resulting from such a number of tests of different makes of engines would be interesting and would be pleased to see them.

### TWO SOLUTIONS OF THE MYSTERY OF NO. "636."

Editor THE AUTOMOBILE:

[670.]—In your issue of March 14, letter No. 636, re "mystery." This is certainly an interesting occurrence, and would probably puzzle anyone not versed with the nature of acetylene. If I understand aright, the copper tubing was used to convey the acetylene from the generator to the lamps, and it was certainly an error to employ copper for the purpose. Acetylene coming in contact with copper will form a deposit which we might call electrolyte, which, when treated violently, will break, and on breaking produce a visible spark. Of course, there must have been an explosive mixture, which ignited to produce the detonation. Writer has observed copper pins used in an acetylene generator, and has produced visible sparks from same by cutting through the upper crust with a knife.

I trust this will enlighten my friend Burtiss. R. KURTZ.

St. Williams, Ont., Can.

### ACETYLENE AND THE PRESENCE OF MOISTURE.

Editor THE AUTOMOBILE:

[671.]—I would submit the following as an answer to No. 636: Acetylene gas in presence of moisture produces an explosive compound from copper, called copper acetylide ($C_2 Cu_2$), and when dry it explodes very easily from friction or blow, or when heated to 120°. It was owing to this explosive compound (formed inside the copper tubes by the acetylene gas, containing a percentage of water vapor, produced from heat of the carbide in the generator) and not to any remaining gas in the tubes that caused the fireworks. Perfectly dry acetylene gas, as sold by the Prest-o-Lite people in their storage tanks, will not form this compound to any extent, as moisture is necessary to the chemical reaction.

Akron, O. C. A. WILLIAMS.

### SHEDDING A LITTLE LIGHT ON NO. 633.

Editor THE AUTOMOBILE:

[672.]—In reference to query No. 663, I think I can possibly shed some light on the subject referred to therein. I have heard it said that the rate of propagation of ignition of gasoline vapor to be 60 feet per second, under normal, that is, atmospheric pressure, and that this rate is directly proportional to the pressure. My authority for this statement is the mechanical engineer of one of the largest automobile factories in the country.

Cleveland, O. CHARLES E. BAILEY.

### IN EXPLANATION OF "631's" QUERY.

Editor THE AUTOMOBILE:

[673.]—In re letter No. 631—"A Peculiar Trouble." I have noticed the same trouble in lubrication of six-cylinder engines, and believe it to be caused by the crankcase, for the oil always leaves the section which vibrates most and works toward the section which vibrates least. I have never seen this trouble in six-cylinder engines which have every other partition light, with no passage over the top.

H. A. S.

### STATIC ELECTRICITY SUGGESTED AS CAUSE.

Editor THE AUTOMOBILE:

[674.]—In reference to B. A. Burtiss' letter No. 636, I should say the gas was exploded by a spark, caused by the discharge of static electricity contained on his body to the copper tubes. I do not consider this as necessarily final, but merely give it as my opinion.

Morristown, N. J. W. G. HURTZIG.

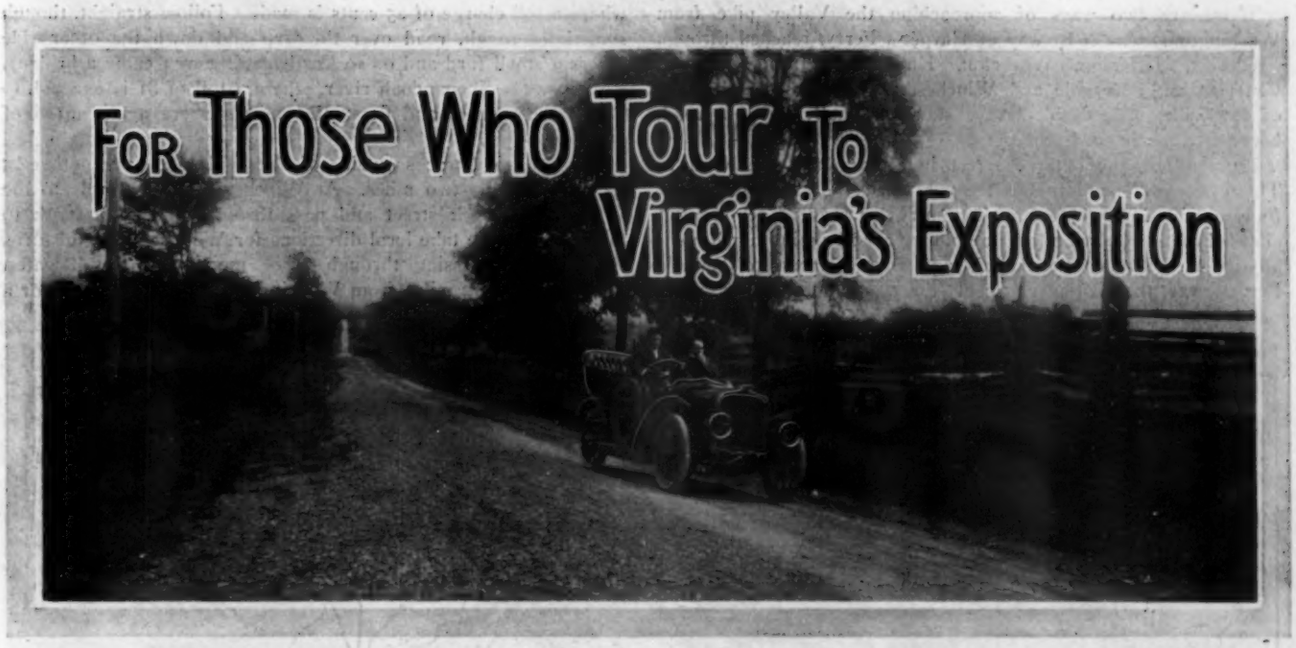
### WORTH THE PRICE OF A YEAR'S SUBSCRIPTION.

Editor THE AUTOMOBILE:

[675.]—Although I have been a reader of your magazine for some time, it is only recently that I have been a subscriber. I think that the page "Letters Interesting and Instructive" is worth the price that you ask for the whole magazine.

Rochester, N. Y. H. A. STRICKLAND.

# For Those Who Tour To Virginia's Exposition



ON THE PICTURESQUE SHENANDOAH VALLEY PIKE, WHERE TOLL GATES ARE FREQUENT BUT THE ROADBED IS EXCELLENT.

INTEREST in automobile touring south of the Potomac river has been growing very rapidly for the last two or three years. The idea has been generally prevalent that tours in Virginia and towns south thereof should be undertaken with caution, on account of the bad state of the roads. This remains equally true to-day, and yet, with the increased capability of the automobile to cover long distances in almost any kind of country it is not surprising that actual trips have already been successfully carried through this section.

The most notable of these is perhaps the trip from New York to Ormond, Fla., made by an Oldsmobile touring car in December last, notes and map of which appeared in THE AUTOMOBILE at that time, together with a discussion of other possible routes through the South. As the Ormond-Daytona season is now practically over, it is probable that no more trips through to Florida will be undertaken, at least until next fall.

On the other hand, interest in touring to and from the Jamestown Exposition, Norfolk, Va., has been increasing very rapidly. It has been suggested that this would be a good terminus for the 1907 A. A. A. tour, although the latter consensus of opinion seems to be that the hotel accommodations will be inadequate and the difficulties practically insurmountable for a large party.

This does not by any means lessen the interest in the route south of the Potomac, and the chances are that a number of individual trips will be made to and from the exposition, irrespective of whether or not the Glidden tour goes that way. Last summer Augustus Post, former chairman of the A. A. A. Touring Board, made a complete trip from the North to Jamestown by the way of Washington, Hagerstown, the Shenandoah Valley, Richmond and Norfolk. This preliminary exploration was made by Mr. Post under the auspices of the Jamestown Exposition authorities, the Norfolk Automobile Club and the Richmond Automobile Club.

Full and complete notes were furnished by Mr. Post, both to the Exposition authorities and to "THE AUTOMOBILE Official A. A. A. Blue Book." In connection with the publication of this matter in the "Blue Book," a double page map of the Shenandoah Valley on the north and the Virginia coast on the southeast has been prepared for publication in the 1907 edition. The map referred to, somewhat reduced for convenient publication in THE AUTOMOBILE, is reproduced herewith in connection with an article by C. H. Claudy, dealing in a less detailed manner with a corresponding trip made by himself with a well-known autoist of Washington, D. C., over substantially the same territory.

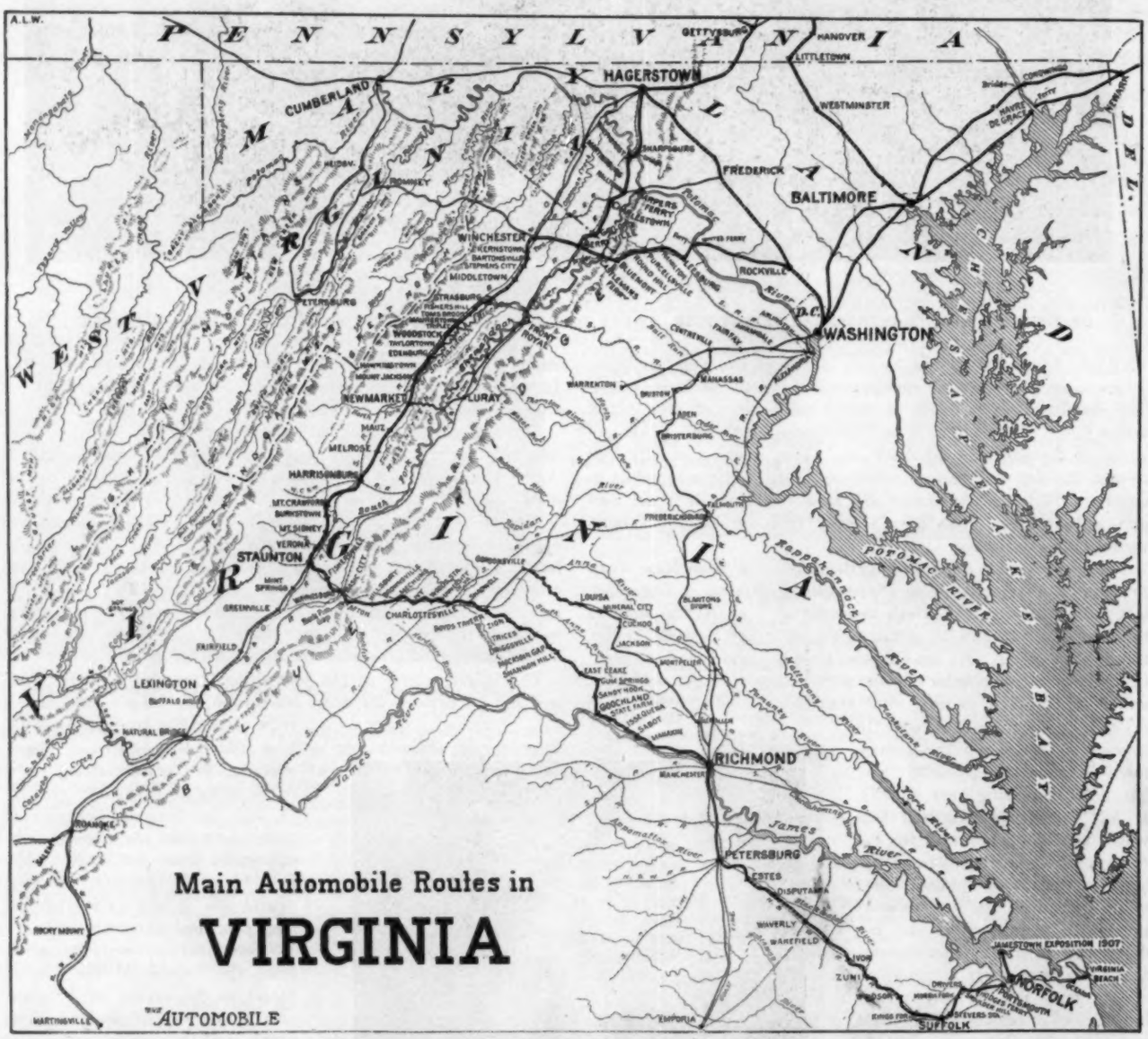
The official route to the exposition, compiled by Mr. Post, will not be printed for some little time; its length precludes it from publication in THE AUTOMOBILE. Mr. Claudy's story, however, gives an interesting view of practically the same country as seen by himself, although in some particulars the trip made by him varies from that made by Mr. Post for the exposition. In that degree also it will vary from the map published herewith.

There are two ways of going from the capital of the United States to the capital of Virginia. One is by way of the old Telegraph road through Manassas and the other is to and through the Shenandoah Valley pike. The first is shorter, but very much rougher; the second, a longer route, yet allows much better time to be made on account of the good roads. No one ever having experienced the two would hesitate for an instant to choose the longer route, which is therefore given here as the most practical and satisfactory route to accept.

WHERE TIRE CHAINS ARE VERY USEFUL.

There are two ways of approaching the Valley pike from Washington. One is by way of Harper's Ferry, reached through Frederick, Jefferson, Weverton, Knoxville, Harper's Ferry, Charlestown, Berryville and Winchester. The other is by way of Rockville, Md., decidedly the shorter, equally good in road, but not so much good scenery.

Proceed out any lettered street in Washington westward to Thirty-second street; follow the car tracks north to Rockville, fourteen miles, over a very good country dirt road. Keep straight ahead through Rockville, over a country road running north, usually good, with occasional hills and rough places, to White's Ferry, over the Potomac, twenty-three miles from Rockville.




Here cross the river on the ferry (ferriage 50 cents per car and four people) and climb the steep bank on the other side of the river. One mile further find the Leesburg turnpike, there bear left for Leesburg, Va., eight miles from White's Ferry and forty-five miles from Washington. Here find a toll gate, where a 10-cent toll is charged, and a book produced which the motorist must sign with name, address, number of Virginia license, direction going, and the date.

Proceed straight through Leesburg for Hamilton, Purcellville and Round Hill, all on the pike, which runs straight through them, for Bluemont, sixty-two and five-tenths miles from Washington. Here make sharp right turn for top of Snicker's Gap, where a toll charge of 25 cents is made. Follow straight, though sometimes rough, road over the Gap and down the other side across a small ford and on to Castleman's Ferry (now a bridge). Run over the Shenandoah river, where a toll of $1 is exacted, to Berryville, seventy and five-tenths miles, where again a toll of 25 cents is due.

Cross railroad tracks outside of Berryville and pay another 25 cents toll, eighty-two miles. At Winchester bear sharply to the left out Braddock street and pass through three toll gates to Strasburg, where take local directions for Woodstock (road turns sharp right), passing through three more 10-cent toll gates. Woodstock is 112 miles from Washington and a good place for a country meal. Proceed straight through on pike to Millertown, Hawkinstown and Mt. Jackson, toll gate at each place, with book to sign, to New Market, Va., 131 miles.

### Visit Luray and the Caverns.

If no detours are to be made, pass straight through, but if possible to spare the time spend night here and turn sharp left next day for Luray and the Caverns, fourteen miles. Road is horribly rough and rocky, but can be covered inside of two hours with almost any machine and in one hour with a good climber. Road is plain, over Massanutten mountain, where a beautiful view is to be had, and 15 cents toll paid each way on top, four miles from

New Market. Cross ferry over Shenandoah at White House Ferry (25 cents), ten miles from New Market, and follow road to sign, making left-double-back, as sign points, to Luray Caverns.

Charges are from 50 cents to $3 per head at Caves, depending on hours, whether excursion day or not, and number in party. Sight is most wonderful and beautiful and the hour and a half spent in Caves well worth the highest price charged. Luray Caves are said to be the most beautiful, though by no means the largest, in the world. Take dinner at Lawrence Hotel (in spite of contrary directions from ferryman, who "caps" for another hotel), one mile from Caverns. Gasoline can be obtained here if necessary.

Return same way to New Market, and from there proceed down pike to Harrisonburg, three toll gates, 150 miles from Washington. Harrisonburg has a garage, where a machine may be left over night at a charge of $1, and gasoline obtained. Also very fine modern hotel, with rather poor café.

**Toll Gates Are Very Numerous.**

Leave Harrisonburg on pike for Staunton, passing through six toll gates, and having clear, straight road to Staunton, 177 miles from Washington. Staunton is a good-sized town; here garage and machine shop can be found, also gasoline and oil; Hotel Beverly is best in city. Leave Staunton by Johnson street for Waynesboro, twelve miles, over very good dirt road. Pike ends at Staunton. Waynesboro to Meechum's river is a hard pull, taking in a mountain pass (Rock Fish Gap), one mile up and one down the other side. This is as rough and rocky a stretch as it would be possible to negotiate a car over. By all means have and put on gripping chains, particularly in wet weather. Go very slowly and carefully down other side—dangerous to speeding. Meechum's river is seventeen miles from Waynesboro.

Here turn sharp right at railroad tracks and again sharp right 300 feet further on, to Charlottesville, forty miles from Staunton. Follow car tracks past University of Virginia down to business section. Here turn left on any cross street to High street. Out High to right to bridge, two miles, where turn right across bridge. Seven miles from Charlottesville take left fork at pretty country mansion called La Forche, for Gordonsville, twenty-one miles from Charlottesville. Road is fair out of Charlottesville, but gets worse as Gordonsville is approached, and is very bumpy last five miles; also very sticky in wet weather—chains are a necessity. Gordonsville has a very fair country hotel (Keegan House), where a good dinner can be secured, but the hotel is right on the railway and sleep is difficult. Gasoline sometimes to be had; if not here, then at Louisa Court House, which reach direct south from Gordonsville over fine country road. However, this run crosses the railway tracks fourteen times in the fifteen miles to Louisa. At Louisa gasoline is 25 cents per gallon.

Leave Louisa on straight road and first fork beyond turn left and follow railroad tracks to Mineral City, six miles. Two hundred yards beyond old mill at Mineral City take road to left across railroad and follow tracks to Cuckcoo, five miles from Mineral City. Here take left fork in road to Jackson, seven miles over very poor, rough road; one mile below Jackson take right fork in road and follow sandy road, heavy going, to Montpelier, eleven miles. At Montpelier keep road to left and follow it to Glen Allen, where cross railroad tracks and get on pike again, twelve miles to Richmond. Three and one-half miles from Richmond pike becomes the Brook turnpike, with 20 cents' toll to pay, and road is then perfectly straight to Richmond, which enter straight and keep to Broad street, where turn left for Hotel Richmond.

Richmond is 314 miles from Washington, or, as you will go, including Luray, 343 miles. Gasoline can be obtained at the following places on the line: Leesburg, Woodstock, New Market, Luray, Harrisonburg, Staunton, Charlottesville, Gordonsville (probably), Louisa and Richmond.

Country people are kindly disposed towards automobilists, but expect and must receive consideration for horses, as many of the animals are spirited and badly frightened at the machine. Always stop at signal and help drivers, particularly women with horses. Horses prefer to be led past machine to having machine driven past them. Not much opportunity for speeding over thirty miles per hour anywhere, on account of teams, toll gates and turns in road; but scenery is very fine all the way and trip well worth taking. Total toll charges from Washington to Richmond, including ferriage and toll charges to Luray (not including Cavern fees), $5.10.

A PRETTY GOOD FORD WHEN NEARING RICHMOND.

## A. C. A. TOUR TO JAMESTOWN EXPOSITION.

It is the intention of the Automobile Club of America to have a June tour to the Jamestown Exposition, limited to members of the club. The details will be announced shortly, and the route selected will be different from any one yet proposed. Chairman Waldron Williams of the Runs and Tours Committee, after consultation with Chairman Robert Lee Morrell of the Contest Committee, who is a New York State Commissioner of the Exposition, has about decided upon the Cape Charles route, which means that the run would be from New York to Philadelphia, to Cape Charles, whence ferry would be taken to Norfolk, the cars being carried on a freight transport and the tourists on a regular passenger boat. It is said that a fairly good road exists through the eastern shore of Maryland, and arrangements for a stopping place over night will be provided for by sleeping cars located at some point midway between Philadelphia and Cape Charles. The first night's stop would be in Philadelphia, the run there being 106 miles.

CROSSING A STRETCH OF SANDY ROAD NEAR WAVERLEY.

# CLUBS PREPARING FOR THE SUMMER SEASON

### Route for New Jersey Endurance Run Agreed Upon.

NEWARK, N. J., March 25.—At a full meeting of the special committee of the New Jersey Automobile and Motor Club, in charge of the plans for the three-day endurance run of May 30-June 1, held last Thursday evening, the route in detail was selected. One of the most important decisions arrived at during the meeting was the matter of controls. If satisfactory arrangements can be made, the noon stop will be made at Washington on the first day, at Trenton on the second day and at Lakewood on the third day. In addition to these, there will probably be an intermediate control on each day, both morning and afternoon.

The cars will leave the clubhouse at Broad and Chestnut streets on the first and second days of the run, and the clubhouse will also be the official finishing point on the first and third days. The route for the run up from Atlantic City to Newark on the third day was shortened somewhat in order that the cars may all arrive at the Broad street clubhouse in time for the reception which is to be tendered the participants in the tour. The route in detail follows:

First day—Newark, Montclair, Caldwell, Pine Brook, Parsippany, Whippany, Morristown, Mendham, Chester, German Valley, Port Colden, Washington (noon control), New Hampton, Junction, Glen Gardner, Clinton, Avondale, Mechanicsville, North Branch, Somerville, Bound Brook, Dunellen, Plainfield, Scotch Plains, Springfield, Hilton, Newark.

Second day — Newark, Elizabeth, Metuchen, New Brunswick, Dayton, Cranberry, Hightstown, Windsor, Edinburgh, Mercerville, Trenton (noon control), Bordentown, Columbus, Mt. Holly, Mechanicsville, Moorestown, Merchantville, Collingwood, Kirkwood, Berlin, Waterford, Hammonton, Elwood, Egg Harbor City, Pamona, Absecon, Pleasantville, Atlantic City.

Third day—Atlantic City, Pleasantville, Absecon, Oceanville, Smithville, Pt. Republic, New Gretna, Tuckerton, Manahawkin, Barnegat, Waretown, Forked River, Bayville, Toms River, Lakewood (noon control), Lower Squankum, Freehold, Matawan, Old Bridge, New Brunswick, Metuchen, Rahway, Elizabeth, Newark.

**OFFICERS AND WELL-KNOWN MEMBERS OF THE LADIES' QUAKER CITY MOTOR CLUB.**

**Mrs. J. J. Martin, president; Mrs. Edward Beecher Finch, secretary-treasurer; Mrs. Chas. Swain, Mrs. William Nobles, vice-presidents; Mrs. Thomas Durham, Mrs. George Muller, Mrs. Aaron Mendenhall, Mrs. John Laird, Mrs. Charles Smirle, Mrs. William Trinkle, Mrs. Percy Chandler, Mrs. Hubert Reading, Mrs. Harry Cook, Mrs. Munyon, Mrs. Robert Pitta, Miss Nilson.**

### Motor Boat Club of America Minstrel Show, April 10.

NEW YORK, March 27.—The minstrel show of the Motor Boat Club of America will be held in Madison Square Garden concert hall, Wednesday evening, April 10. The occasion will be "Ladies' Night" and an enjoyable occasion is looked for. The latter part of April a lecture will be given on the care and handling of motor boats, and in May a lecture on motor boat racing. Tickets for the minstrel show, except for the boxes, are not sold.

### Quakeresses Have a Model Automobile Club.

PHILADELPHIA, March 25.—Organized just eleven weeks ago with thirteen members, the Ladies' Quaker City Motor Club already has sixty-five names on its roll, and by the time the charter list closes, on May 1, the Recruiting Committee promises that the one hundredth name will be added to the roll. In its rapid growth the club resembles its namesake—the Quaker City Motor Club—but the two organizations are entirely separate. Many of the members of the new club are wives, sisters or daughters of those composing the older organization—but that ends the relationship.

Application has been made for a charter, Attorney C. W. Talbot, of West Chester, having charge of the matter. The objects of the organization, as stated in the charter, read very much in the order of those which the sterner sex strive for when they form an automobile club—to promote track and road events, to further sociability, to influence legislation favorable to motorists, etc. The constitution and by-laws are the joint work of the president, Mrs. Joseph J. Martin, and the secretary-treasurer, Mrs. Edward Beecher Finch (the latter president of the Women's Press Club). The other officers are: Mrs. Charles J. Swain, first vice-president, and Mrs. William Noblit, second vice-president. A board of ten directors, of which the officers named are members ex-officio, manage the affairs of the club. In forming the club the original thirteen took no chances, but secured the services of ex-District Attorney Bell to coach them and see that everything was done in legal fashion.

Not to be outdone by mere men, the Quaker City ladies have secured quarters in the Majestic—a suite of three rooms, now nearing completion. The color scheme of the cozy home will be blue and gold—the club colors—and the fittings throughout will completely overshadow those of the home of the Quaker City men in the same building—and this despite the fact that the quarters of the men's club are a marvel of neatness and comfort. The new quarters will be thrown open to the members for the first time on Friday afternoon, April 8, when President Martin will entertain her friends at an informal reception. Later, at a date not yet decided upon, the husbands and fathers and brothers will be entertained. A surprisingly large proportion of the members can handle an automobile, and not a few of them own cars.

President Martin is now engaged in forming her committees, one of the most important of which is that which will prepare a schedule of runs, a gymkhana and other events.

A peculiar feature of the club's affairs which Secretary-Treas-

urer Finch commented upon to THE AUTOMOBILE representative was the insistency with which the number "13" projected itself into the club's deliberations. There were 13 at the temporary organization, 26 at the permanent organization, 39 at the fourth meeting, 52 at the meeting on March 13, and 65 on the roll now—all multiples of 13. Nothing daunted, however, the Quakeresses propose to strive onward and upward, leaving superstitious worries to those who can be affected by coincidences of the kind.

### New York Motor Club Plans an Elaborate Orphans' Day.

NEW YORK, March 26.—Orphans' Day will again be the leading event on the calendar of early summer outings of the New York Motor Club. This was decided upon at the last meeting of the board of directors, and a committee was appointed consisting of S. A. Miles, chairman; W. J. Morgan and R. G. Howell, with power to select associates, to conduct the run. The date has not yet been selected, but it will probably be the latter part of May or early in June. It is planned to have this year's Orphans' Day eclipse in importance and its benevolent objects the two previous yearly runs conducted by the club, and a concerted effort will be made to provide ample accommodations for the transportation of all the children.

It was definitely decided at the recent directors' meeting that the club should own a home of its own, and steps were taken to secure a site in the vicinity of the Grand Circle at West Fifty-ninth street. Plans were adopted for the financing.

### English System for Worcester Hill Climb.

WORCESTER, MASS., March 28.—Worcester will have its third annual automobile hill climb on Dead Horse hill here in May, the date to be announced later. It will be under the auspices of the Worcester Automobile Club, as the others have been. For the first time in America the new English system of handicapping probably will be employed. The system is now being earnestly discussed, and is generally favored by members of the Worcester club. If it is put into operation, it will be the first time a meet in America has been so conducted, and its success or failure will be awaited with interest. By the English system only one event is run, all cars participating by an equitable system of handicapping. By plotting the curves in advance there is little to do except see that the contestants give correct data, figure the elapsed and corrected times, and announce the results.

### Chicago Ladies Form a Motor Club.

CHICAGO, March 27.—The Windy City has an automobile association in which the mere man plays no part. It bears the title of the Chicago Women's Motor Club, is blessed with all the vigor of youth, and has just held an informal meeting, followed by an adjournment for tea at the Lexington Hotel. The ladies will hold a floral parade in May. The officers are: President, Mrs. C. H. Foster; vice-president, Mrs. A. F. Chase; treasurer, Miss A. M. Andrews; secretary, Mrs. N. J. Boardman.

### Quakers Must Change Date of Their Hill Climb.

PHILADELPHIA, March 25.—Continued opposition to permitting the Quaker City Motor Club to run off its hill climb on City Line on Memorial Day has forced the Contest Committee to change the date to May 25 or June 1. An effort will be made to get a permit for either of the Saturdays mentioned, failing which City Line will be abandoned and one of the other courses taken up.

### Globe-Girdler Glidden Relates Experiences to Buffalonians.

BUFFALO, N. Y., March 26.—Charles J. Glidden, donor of the Glidden trophy, delivered an interesting address last Friday night to the members of the Automobile Club of Buffalo and their friends. Most of the talk related to sights seen in the Far East and many funny experiences in China and Japan were mentioned. Stereoscopic views were shown by Dr. C. E. Cummings.

## THE AUTOMOBILE CALENDAR.

### AMERICAN.

#### Shows.

April 1-6.....—St. Louis, Mo., Automobile Show, Jai Alai Building, St. Louis Automobile Dealers' Association.
April 6-13.....—Montreal, Canada, Second International Automobile and Sportsman's Exhibition. R. M. Jaffray, manager, 309 W. Notre Dame street.
April 8-13.....—Pittsburg, Pa., First Annual Show of the Pittsburg Automobile Dealers' Association, Duquesne Garden.
April 11-13.....—Denver, Col., Automobile Show, Coliseum Hall, G. A. Wahlgreen, manager.

#### Races, Hill-Climbs, etc.

April 1.....—St. Louis, Mo., Auto Floral Parade, Automobile Club of St. Louis.
May 6-7.....—Harrisburg, Pa., Two-day Endurance Run, Motor Club of Harrisburg.
May 25 or June 1—Philadelphia, Hill Climb, Quaker City Motor Club.
May 30.....—Chicago, Memorial Day Race Meet of the Chicago Motor Club.
May 30-June 1..—Newark, N. J., Three-day Endurance Run of the New Jersey Automobile and Motor Club.
Oct. 19.....—St. Louis, Mo., International Aerial Race of the Gordon Bennett Prize. Aero Club of America.

#### Motor Boat Races.

June 8.....—670-Mile Ocean Motor Boat Race, New York to Bermuda. Motor Boat Club of America and Royal Bermuda Yacht Club.
July 20.....—New York to Marblehead, Mass., 270-mile Motor Boat Race. New Rochelle Yacht Club.
Sept. 2-6.....—Jamestown (Va.) Exposition, Motor Boat Races.

### FOREIGN.

#### Shows.

April 6-13.....—London, Agricultural Hall Motor Show.
May 4-15.....—Madrid, Spain, Automobile Exhibition, Palace of Fine Arts, Royal Automobile Club of Madrid.
May 15-26.....—Zurich, Third Annual Swiss Automobile Show.
June 25-30.....—St. Petersburg, Russia, Automobile Show.

#### Race Meets, Hill Climbs, etc.

April 1-16.....—Spring Wheel Competition, A. C. of France.
April 18.....—Paris, La Coupe des Voiturettes, A. C. of France.
April 21.....—Targa Florio Tour (Sicily), Auto Club of Milan.
April 25-28.....—Touring Contest, Automobile Club of Touraine.
April 28.....—Chateau Thierry Hill Climb.
May 15-31.....—Belgium, Industrial Vehicle Trials, Automobile Club du Nord.
May 18-21.....—Milan, Italy, Touring Club Trials.
May 24-27.....—Voiturette Contest, Automobile Club of Austria.
May 28.....—Isle of Man, Tourist Trophy Race, Automobile Club of Great Britain and Ireland.
May 30.....—Isle of Man, Heavy Touring Car Race, Automobile Club of Great Britain and Ireland.
May 22-25.....—Irish Automobile Club Reliability Trials.
June 3-12.....—Paris, Electric Vehicle Competition, Automobile Club of France.
June 3-12.....—Herkomer Cup, Automobile Club of Bavaria.
June 14.....—German Emperor's Cup, Taunus Circuit, Imperial Automobile Club.
June 20-22.....—American Gold Cup, Start from New York of European Tour for American Cars, Georges Dupuy, secretary, 1402 Broadway, New York City.
June 14-29.....—Scottish Reliability Trial, Scottish Automobile Club.
July 2.....—Grand Prix, Automobile Club of France.
July 14, 1908....—Paris to London, Aerial Race.
July 15-18.....—Ostend Week, Record Trials, Automobile Club of Belgium.
July 21.....—Ardennes Circuit (Belgium).
July 31.....—Liedekerke Cup for Touring Cars, Ardennes Circuit, Belgium.
July 31-Aug. 8..—Belgium Regularity Contest for Touring Cars. A. C. of Belgium.
August 1-7.....—Criterium of France, 1,750 Miles Touring Competition and 250-mile race for the Press Cup. A. C. of France.
August 11-29...—France, Coupe de Auvergne.
Sept. 1.....—Italy, Brescia Circuit, Florio Cup. A. C. of Italy.

#### Motor Boat Races.

April 2-15.....—Monaco Motor Boat Exhibition and Races.
April 15-30.....—Nice, Motor Boat Races.
June 15-28.....—Kiel (Germany) Motor Boat Races.

THE AUTOMOBILE

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| Copies printed | in 1905, - - - - - - - - - - | 730,000 |
| " " | in 1906, - - - - - - - - - - | 791,000 |
| " " | This Issue, - - - - - - - - - | 18,000 |
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***Legislative Mills Are Not So Obnoxiously Busy.*** Though the time when every State Legislature does not feel it incumbent upon itself to propagate and attempt to pass a number of bills every year is still far in the distance, signs are not wanting that things are at least tending in that direction. That such a state of affairs must ultimately come to pass, anyone who wishes to look but a decade cannot fail to realize. Long before the bicycle had tumbled from the extreme heights of favor to which it had been boosted, the thousand and one laws and municipal ordinances with which every statute book the country over was loaded had practically passed into oblivion. So far as their actual legal force and effect went, they were as operative as the day they first received the sanction of the all-wise bodies that had formulated them—in reality, the ducking stool and the stocks were not more dead than they.

In the fullness of time much of the legislation that is now thought to be a crying necessity for the proper restriction of the new method of locomotion and its owner will have been relegated to the same category. Laws there will always be, but it will no more be thought necessary to make them more burdensome at every opportunity than is now the case with the bicycle. The automobile is settling down more and more into the daily life of a constantly increasing proportion of the population, and long before it becomes universal, if any institution can ever really be accorded that quality, the necessity for making its possession as onerous a burden as possible will no longer be apparent, even to the Solons who guide our destinies from afar. As to the present signs of encouragement, we may be deceived. It is quite possible that these same gentlemen may have been so attentive to other and more profitable fields of legislation that for the moment the automobile has been relegated to a second place. It will be there when wanted again. Whatever the cause, there certainly has been a slowing up of the legislative mills all over the country; there has been less legislation and less attempt to make it drastic than ever before. For that much let us be thankful, and at the same time be appreciative of the successful efforts of several State associations of the American Automobile Association in assisting in the general discouragement of too much legislation.

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***Passing of the Quickly Assembled Car.*** There is one thing for which the automobile industry as a whole can never be too thankful for, and that is the fact that it has never experienced an out-and-out boom. One of those huge bubbles of simulated prosperity that swell to immense dimensions in a short time, and, bursting, leave an entire industry prostrate. A combination of circumstances, coupled with the wise foresight of those behind the representative organizations of manufacturers which entered the field so early in the history of the industry, sufficed to prevent any such calamity. To be of any value an automobile must be well built, of good materials—factors that do not lend themselves to the rapid production of cars without a large outlay of capital and a well-perfected organization, backed by brains and executive ability.

Not that this has prevented the attempt—quite the contrary; 1903 witnessed the closest approach to a boom that the industry has ever suffered. Motors were bought in one place, bodies in another, and in this manner the components of a car were collected and put together under conditions and with the aid of facilities about on a par with those at the hand of the average amateur mechanic who has a workshop in his barn. Fortunately the influences referred to were strong enough to successfully combat this flurry, that bade fair to flood the market with worthless junk. Not that it is intended to belittle the assembled car as such. There is probably not a factory to-day on either side of the Atlantic that attempts to turn out the complete automobile. In a few instances in this country every part of the machine and its accessories that can be profitably turned out in one factory are produced, but there must always be many things which the specialist is far better fitted to manufacture. Doubtless there are more assembled cars on the American market to-day than ever there were, but most of them will be made in their own factories within the next two years or less. Many of the best known cars were assembled but a few years ago, but one by one they have achieved homes of their own in the sense that they are now turned out as far as possible by their makers, and it is this constant passing of the assembled car that is one of the best guarantees of the industry's solidity.

✸

***The Degree of Bachelor of Automobiling.*** Indicating unmistakably the rapid growth of automobiling is the attitude of the leading universities in beginning to give special attention to a subject of widespread interest and the greatest value to the welfare of the country, for it means the solving of quick transportation for the individual in and about cities and towns and even across States and into foreign countries. Add to this the distribution of all kinds of freight and business traffic, and the magnitude of the automobile industry approaches a degree second to none in the development of the republic. There will also be added to the curriculum of the colleges a department on roadmaking and the graduating of experienced roadbuilders, for the improvement of the highways inevitably follows in the wake of the motor-driven vehicle. Even now a Pacific Coast university is to add a course on roadbuilding, providing its State legislators are agreeable, which seems to be assured in advance.

## IN NEW YORK'S LEGISLATIVE MILL.

ALBANY, N. Y., March 25.—Assemblyman Young's bill for the insurance of automobiles has been unsatisfactory to the Senators, and they have had it amended and reprinted twice, and it is now on the third reading calendar of the Senate. The new section to be added to the insurance law now allows insurance companies to be formed to issue policies as follows: "Against loss or damage resulting from accidents caused to or by a vehicle, conveyance, or duly licensed automobile, either to the vehicle, conveyance or automobile itself or to any other property." The amendment makes it more than an auto insurance law, and takes in all other vehicles. It is expected to pass the Senate this week, and as amended will have to go to the Assembly for concurrence before it can be sent to the Governor.

The Brough impounding of motor vehicles has been changed by a substitute bill, and the new amendment relative to the giving of security, either cash, guarantee bond, or machine in case of arrest and the addition of an impounding section for the retention of a machine left for bail, is now back in the general laws committee.

## MISSOURI BILL AWAITING SIGNATURE.

JEFFERSON CITY, MO., March 25.—What is known as the House Substitute bill, having been passed by both houses of the State Legislature, is now in the hands of the Governor, awaiting his signature to become a law. Its chief features are the provision of a $5 registration fee, payable to the Secretary of State, and a speed limit in the open country of fifteen miles. Three-inch numbers and lights are required, besides which the autoist is hedged around with a cordon of regulations regarding coming to a halt and also stopping the motor at the beck of a driver of horses. It was attempted to cut the speed limit down to ten miles, but Senator Peck, the only member of the Senate who owns a car, then proposed that a further amendment permitting automobiles to keep up with funeral processions be added. The speed-reducing amendment was lost by an almost unanimous vote.

## TO MEET A FUTURE CRY FOR ROADMAKERS.

SEATTLE, WASH., March 25.—One of the results of the good roads movement in this State is an effort that has just been launched to have appointed to the faculty of the State University an instructor in highway building. The officers of the State Good Roads Association are advocating this very strongly, and urging that a man of national reputation be secured. In a measure the present effort is due to Samuel C. Lancaster, consulting engineer, Department of Public Highways, who has been spending the past few months here, and speaking on the subject of good roads in various sections of the State. He maintains that there is a great future for the expert road builder.

## PERTH AMBOY BRIDGE RECONSTRUCTION.

As a result of the closing to traffic of the bridge across the Raritan river between Perth Amboy and South Amboy, N. J., no automobile tour can be scheduled across Staten Island to North Jersey coast points except by the long detour via Metuchen and New Brunswick, thus adding twenty-four miles. All traffic over the bridge will be suspended probably until mid-summer, it being estimated that the replacement of the present span with one satisfactory to the War Department will require that length of time.

## C. P. MALCOLM, TWO-CYCLE ADVOCATE, ILL.

C. P. Malcolm, of Detroit, Mich., the well-known advocate of the two-cylinder engine, is reported to be very ill at the present time, and it is probable that nothing more will come from his pen for the next few months. His early recovery is hoped for by the many who have read his articles, even though all do not entirely agree with him.

## AUTO ENGINEERS TO HAVE SUMMER MEETING.

The Society of Automobile Engineers will hold a three-day summer meeting at Buffalo on dates to be selected later, but between July 20 and August 10. This was decided upon at a session held Saturday night last in the Flatiron Building, New York City. One of the three days will be devoted to visiting the several large automobile plants in Buffalo. The committee in charge of arrangements consists of T. J. Fay, Henry Hess and H. M. Swetland.

President A. L. Riker announced that the society had been recognized as a permanent engineering society by the American Society of Mechanical Engineers, and therefore there would be an exchange of papers between the two organizations.

A publication committee to take charge of all papers for publication was appointed, consisting of H. F. Donaldson, H. F. Towle and A. L. Clough.

## NEW HAVEN'S SUCCESSFUL SHOW.

NEW HAVEN, CONN., March 28.—The automobile exposition held the past week in the Second Regiment Armory has been most successful. It was under the auspices of Troop A, Cavalry, and the management of William E. Dobbins. Crowds thronged the exposition hall the entire week.

Among the automobiles shown were: Franklin, Knox, Babcock, Locomobile, Bailey, White, Autocar, Springfield, Continental, Buick, Thomas, Jackson, Cadillac, Haynes, Rambler, Royal Tourist, Elmore, Logan, Bowers. Also exhibiting: Motorcycle Co., Colonial Rubber Tire Co., Crescent Automobile Supply Co., Sanford Motor Co., New Haven Auto Supply Co., Maley Motorcycle Co.

As an outcome of the show the dealers formed an organization to be known as the New Haven Automobile Association. These officers were elected: President, Cowles Tollman, of the Holcomb Automobile Company; vice-president, W. A. Maynard, of the Thomas agency; secretary and treasurer, Walter A. Crounsell, of the New Haven Automobile Corporation.

## ONE-THIRD OF A CENT A MILE PER PASSENGER.

From 200 owners of single-cylinder Cadillacs, the Cadillac Motor Car Company announces that it has received affidavits which demonstrate thoroughly that the average cost to them for maintaining their cars has been about $2.50 per month, the terms of use running all the way from one to four years. This makes the average cost per mile one and one-third cents per car, or an average of only about one-third of a cent per mile per passenger. These average costs are based on the expense of gasoline, oil, repairs, etc., and in some cases including tires. The Cadillac company calls attention to the fact that these 200 owners are scattered all over the United States and not a few isolated cases. In some of its current advertisements in trade papers, including THE AUTOMOBILE, the Cadillac company is calling attention to its interesting series of advertisements.

## ROYAL AUTO CLUB TO OCCUPY WAR OFFICE.

LONDON, March 19.—For the second time within five years the Automobile Club of Great Britain and Ireland, now called the Royal Automobile Club by command of King Edward, has been obliged to remove owing to cramped quarters. The clubhouse at 119 Piccadilly will very shortly be vacated in favor of the old War Office building in Pall Mall, until quite recently occupied by the Government.

**In a lecture** before the recently organized Motor Club of the West Side Y. M. C. A., Monday night, Augustus Post said: "The relation between the automobile and practical flying machines is very close, and it is an interesting fact that several automobile manufacturers are now devoting particular attention to the making of light motors of fairly high horsepower for aerial use."

## INDIVIDUALITY IN GRAND PRIX.

There will be more variety of design in the racing machines to compete for the French Grand Prix on July 2 than is usually found in European contests of this nature. French constructors give little intimation of what they will produce for the big event, but from private inquiries it is pretty certain that the machines will be similar in general design to those of last year, with improved and more economic carbureters and more efficient transmission. There will be a greater proportion of shaft-driven machines than ever before. Great Britain, Belgium and the United States depart most widely from the beaten track.

D. M. WEIGEL.

D. M. Weigel, who with Lee Guinness will form the British team in the race, is building a couple of eight-cylinder racers which are bound to attract attention. The cylinders are in one line, the engine being 90 inches from end to end. The accompanying engraving shows Mr. Weigel, who is 69 1-2 inches in height, holding up what is declared to be the longest crankshaft ever made. It is estimated that the Weigel racers will be capable of a speed of ninety miles an hour. The three Belgian racers entered by the firm of Germain will be lightweights, developing 75 horsepower.

Walter Christie, the sole American representative, displays his individuality by entering the only front-drive machine in the race, and the only one of this type to compete on European soil.

## THE VANDERBILT CUP RACE.

According to A. R. Pardington, general manager of the Long Island Motor Parkway, the Vanderbilt Cup race will certainly take place on the eastern section of the parkway, the construction of which will begin first. There will be a straightaway stretch of eight miles or more with wide loops at each end, and the grandstand will probably be located near the easternmost loop. With a road fifty feet wide it will be possible for cars to be driven at the limit of speed in both directions. Probably a whitewashed line will divide the road into two parts. It is expected that the racing section will be ready for use by September 1.

William K. Vanderbilt, Jr., will return from abroad next week, and soon after Chairman Jefferson DeMont Thompson will call a meeting of the A. A. A. Racing Board. Mr. Thompson has recovered from his recent illness.

### Two Dragon Cars for Vanderbilt Race.

Announcement is made through John Kane Mills, president of the Dragon Automobile Company, that there will be two 110-horsepower four-cylinder Dragon racers in the American Elimination Trial of the Vanderbilt Cup race. It is further stated that the cars are well under way and will be ready for road trials early in August.

### Ernest Kelly May Be a Thomas "Cup" Pilot.

PHILADELPHIA, March 25.—A possible pilot of one of the Thomas cars in the next Vanderbilt Cup elimination race is Ernest R. Kelly, who was little heard of until he landed the Flyer at the top of the non-stop heap with a record of over 21 days' continuous running, but who nevertheless has done much creditable track and road work. Kelly is at present managing the local Thomas agency of Marvin & Hart and is keeping in trim by a little occasional fast work on the suburban roads.

## HOTCHKISS AT ROCHESTER BANQUET.

ROCHESTER, N. Y., March 25.—The seventh annual banquet of the Rochester Automobile Club was held to-night at the Genesee Valley Club. Covers were laid for 110 diners. In a decidedly unique manner the repast was served. Cocktails were drunk in oil cans, consomme in Mobiloil cans, while the ice cream was brought to the table in Albany grease cans, regulation size. The menu cards had a front cover showing an automobile speeding along at twilight, with a beautiful cloud effect on the horizon. The picture was framed with automobile tires, and the back cover represented an auto wheel and tire.

President H. S. Woodworth introduced Special County Judge John A. Barhite as toastmaster. The first speaker was William H. Hotchkiss, of Buffalo, president of the American Automobile Association, and he spoke convincingly on the necessity for a national organization. President Hotchkiss took occasion to compliment the Rochester club on its loyal support of the A. A. A. through membership in the State body.

John J. McInerney, George A. Carnahan, J. J. Mandery and J. E. Gleason were other speakers. All of them referred to the coming of a better understanding between the autoists and other users of the road when each respected the rights of the other. Then legislation would become small in quantity.

The club held its annual meeting Monday afternoon. The following officers were elected: President, H. S. Woodworth; vice-president, H. G. Strong; secretary and treasurer, Bert Van Tuyle; attorney, John A. Barhite; consulting engineer, A. J. Rockwood; directors, W. C. Barry, Jr., F. E. Mason, Lee Richmond, Rudolph Schmidt, Griff D. Palmer, J. S. Bingeman, F. H. Bettys, A. F. Crittenden and A. J. Rockwood.

## THE COMMITTEES OF THE A. M. C. M. A.

Chairman Benjamin Briscoe of the Committee of Management of the American Motor Car Manufacturers' Association has completed his list of committees for the ensuing year, interest centering upon the Show Committee, which is first given in the list. Following are the complete committees:

**Show Committee**—H. O. Smith, Premier Motor Manufacturing Company, chairman; William Mitchell Lewis, Mitchell Motor Car Company; J. B. Bartholomew, the Bartholomew Company.

**Tours and Races**—W. C. Marmon, Nordyke & Marmon Company, chairman; V. A. Longaker, American Motor Car Company; F. M. Keeton, De Luxe Motor Car Company; John Dolson, Dolson Automobile Company; E. K. Conover, Conover Motor Car Company.

**Good Roads**—Charles Lewis, Jackson Automobile Company, chairman; James Couzens, Ford Motor Company; John Kane Mills, Dragon Automobile Company.

**Legislation**—R. E. Olds, Reo Motor Company, chairman; Sidney Breese, B. L. M. Motor Car & Equipment Company; George C. John, St. Louis Car Company.

**Membership**—W. H. Van Dervoort, Moline Automobile Company, chairman; Morris Grabowsky, Rapid Motor Vehicle Company; Jesse French, Jr., St. Louis Motor Car Company.

**Advertising and Publicity**—Charles E. Duryea, Duryea Power Company, chairman; G. B. Loudubaek, Buckeye Manufactuing Company; F. M. Keeton, De Luxe Motor Car Company.

**Finance**—James Couzens, Ford Motor Company, chairman; R. G. Harrison, Harrison Wagon Company; L. C. Boyd, Marion Motor Car Company.

**Standardization and Technical**—John D. Maxwell, Maxwell-Briscoe Motor Company, chairman; Charles E. Duryea, Duryea Power Company; Henry Ford, Ford Motor Company; R. B. Crawford, Crawford Automobile Company; L. P. Mooers, St. Louis Motor Car Company; R. E. Olds, Reo Motor Car Company.

**Weight and Transportation**—W. G. Morley, Aerocar Company, chairman; Harry Knox, Knox Motor Truck Company; S. H. Mora, Mora Motor Car Company.

**Tires**—William Mitchell Lewis, Mitchell Motor Car Company, chairman; James Couzens, Ford Motor Company; J. B. Bartholomew, The Bartholomew Company.

**Agencies**—Roger J. Sullivan, Wayne Automobile Company, chairman; W. H. Van Dervoort, Moline Automobile Company; George C. John, St. Louis Car Company.

## GROWTH OF A. A. A. IS RAPID.

Directors of the American Automobile Association are very much in evidence in New York City this week. Yesterday at the club rooms of the Automobile Club of America, West Fifty-fourth street, was held a session of the entire Board of Directors, with President William H. Hotchkiss in the chair. Earlier in the day Chairman Charles Thaddeus Terry had a meeting of the Legislative Board at the Manhattan Hotel, and at about the same time Chairman Robert P. Hooper was presiding at a meeting of the Good Roads Board, held at the offices of the Long Island Motor Parkway. Chairman Frank B. Hower, of the Touring Board, made a report at the afternoon meeting of the Board of Directors, when the annual A. A. A. tour came in for much attention.

The Minnesota State Automobile Association and the Connecticut State Automobile Association were admitted to active membership, and it is understood that Michigan, Wisconsin, Missouri, Kentucky, Maryland, and Indiana are nearly ready to apply for affiliation. Secretary Frederick H. Elliott recently made a very successful recruiting tour of the Middle West. The Hotchkiss administration is the most energetic in the history of the A. A. A., and it is expected that before the year is over the national organization will have a membership of over 20,000.

### Connecticut State Automobile Association.

HARTFORD, CONN., March 25.—The Connecticut State Automobile Association of the A. A. A., consisting of the Bridgeport, Hartford, and New Britain clubs, has been organized with the following officers: President, Hon. George M. Landers, New Britain; vice-president, F. T. Staples, Bridgeport; secretary and treasurer, G. K. Dustin; attorney, Walter S. Schutz, Hartford.

### Minnesota State Automobile Association.

MINNEAPOLIS, MINN., March 25.—These are the officers of the Minnesota State Automobile Association, which has applied for membership in the A. A. A.: President, Frank M. Joyce, Minneapolis; vice-president, George M. Palmer, Mankato; secretary and treasurer, H. S. Johnson, St. Paul. The Minneapolis, St. Paul, Duluth, and Mankato clubs comprise the State body, which has a total membership of nearly a thousand.

### Michigan to Have an A. A. A. State Body.

DETROIT, MICH., March 25.—Michigan representation in the American Automobile Association is assured as the result of a visit to this city of Secretary Frederick H. Elliott, of the A. A. A. Mr. Elliott has been on a Western trip in the interests of the association, and made his first stop at Detroit. From here he went to Milwaukee and Minneapolis. Three clubs are necessary for a State organization. It was Secretary Elliott's purpose to interest the Automobile Club of Detroit, as the Grand Rapids and Saginaw clubs already have membership in the A. A. A. While here Mr. Elliott met President E. S. George and Secretary Harry Skilman, of the local organization, Paul Deming, and James H. Flinn. J. J. Jackson was also on hand, while the Saginaw club sent notice of its accord.

As a result of the conference the Detroit Automobile Club met Thursday evening, when it was decided to act on the matter of obtaining A. A. A. membership, preliminary to the move for formation of the State organization. The three clubs already mentioned will form the nucleus, and it is expected that Kalamazoo, Battle Creek, Jackson, and Muskegon will be represented after the move is fairly underway.

**Governor Folk, of Missouri,** has been requested by a number of good roads advocates of his State to do all in his power to prevent the future use of convicts by labor contractors. The good roads advocates hope that the State Legislature will pass a measure authorizing the employment of convicts in the building of two main State roads.

## ANNUAL OF N. Y. STATE ASSN.

The annual meeting of the New York State Automobile Association, held at Auburn, N. Y., Thursday, March 21, resulted in a general demand for the continuance of Oliver A. Quayle, of the Albany Automobile Club, as president of the organization. Mr. Quayle, as chairman of the Legislative Board, has kept a keen eye on the numerous automobile measures introduced in the New York State Legislature, and it appears probable from present indications that the existing law will continue in effect without any changes. H. S. Woodworth, of the Rochester Automobile Club, was also re-elected to the first vice-presidency; N. M. Pierce, of the Binghamton Automobile Club, to the treasurership, and C. D. Hakes was unanimously continued in the secretarial position.

OLIVER A. QUAYLE.
President New York State Automobile Association.

The New York State Association has a merbership of twenty clubs, including the Cohoes Automobile Club, admitted at the Thursday meeting, and about 3,700 members. Its policy has been to ask nothing unreasonable, and at the same time it has vigorously and successfully contested against oppressive measures.

The Auburn session was attended by the following: President Oliver A. Quayle, Secretary C. D. Hakes, Albany Motor Club; Treasurer N. M. Pierce, Binghamton Automobile Club; S. M. Butler, Emerson Brooks, Automobile Club of America; W. H. Van Auken, Utica Automobile Club; F. B. Hower, A. H. Knoll, D. H. Lewis, Automobile Club of Buffalo; S. C. Tallman, Auto Club of Auburn; A. G. Batchelder, New York Motor Club.

The reports presented showed the State Association to be in a very prosperous condition, with a healthy treasury and a growing membership. Plans were outlined for further increasing the value of the organization to the automobilists of the State.

Following the business session the Automobile Club of Auburn gave a dinner to the directors at the City Club, where the meeting was held. Charles J. Glidden, the "globe-girdler," was the guest of honor, and later in the evening he gave an illustrated lecture for the benefit of the Auburn City Hospital.

## THAT OLD LICENSE OF THE SEARCHMONT CO.

The license of the Searchmont Automobile Company, granted by the Association of Licensed Automobile Manufacturers, was canceled in 1904, the Searchmont company having become bankrupt and failing to pay the royalties required by the license. The trustees of the Searchmont Automobile Company, through its attorneys, recently argued in the Supreme Court before Judge Leventritt asking for opportunity of securing from the books of the Licensed Association all data from March 5, 1903, up to the present time, basing its right upon the claim that its ousting was illegal and that it would prove, through access to the desired reports, that several other members of the association had not settled for royalties. The legal department of the A. L. A. M. designates the suit as a "fishing expedition," and assert that back of it is the American Motor Car Manufacturers' Association. The case is scheduled to be tried the first Monday in April.

**Charles J. Glidden, the donor of the trophy cup** bearing his name, was in Chicago, Wednesday, as the guest of Ferdinand W. Peck. A dinner was given in his honor at the Calumet Club, when prominent Chicago automobilists exchanged ideas.

R. G. KELSEY, IN HIS MATHESON, STARTING THE RUN.

## FROM NEW YORK TO BOSTON IN WINTERTIME.

By R. G. KELSEY.

Half-past five on a March morning is, after all, an uninviting time. When we left the New York garage with our ordinary stock Matheson car it was dark and cold and gloomy, but by the time we had drawn up at the place where the starters were waiting for us it was becoming light enough to distinguish the road easily. It was 6:30 o'clock when we officially started out Jerome avenue.

New Rochelle was reached without incident, but near Stamford Station we had a skid which brought us closer to a telegraph pole than was really comfortable. Bridgeport was reached at 8:15 A.M., the 62 miles having been covered at a fraction under thirty miles an hour. It required sixty-five minutes to reach New Haven, 21 miles beyond, and here we got our first taste of the mud and snow which were going to prove such a deterrent.

At New Haven we swung northward and passed Meriden, 20 miles away, in 55 minutes. An hour later saw us in Hartford, and here twenty-five precious minutes were lost in trying to find some one in town who knew whether the east or the west bank of the Connecticut river afforded the better roads. Up the long hill outside the city we plowed, sometimes on first, mostly on second, speed, through mud that averaged more than eight inches in depth; no wet mud, either, but the soft, sticky, holdfast kind, which the anti-skid chains picked up and threw high in the air behind us. Two hours and twenty-five minutes it took to cover the twenty-seven miles to Springfield. Here another twenty-five minutes was taken for replenishing our gasoline tank, and also filling the cavity in our own systems occasioned by the lack of food from 5 A.M. until nearly 2 P.M.

At 2:10 we left Springfield, being warned that the roads ahead of us were in frightful condition. However, the first fifteen miles to Palmer were very satisfactory, and that town was reached in forty minutes. Here another delay occurred, occasioned by our getting off the road, and after circling around for over half an hour we found ourselves in the same place from which we started.

From Palmer eastward the roads were alternately snowbanks and mudholes, the conditions sometimes varied by occasional stretches of glaring ice, on which the car swung and slewed. Catastrophes, however, were averted and we reached Worcester finally at 5:20. From Worcester into Boston, forty-eight miles, we had hoped for better things, but our hope was doomed to disappointment. The twenty miles which separate Worcester from Marlboro were the worst of our trip, and our time was so slow that we began to wonder if we ever would see the lights of Boston. From Marlboro—which we left at 7:30—into Boston the conditions steadily improved, and when at length we saw the glittering lights on the Capitol as we swung down Commonwealth avenue we felt that we had indeed come to the end of our journey. The city limits were passed at 7:50, and we drew up in front of the Horticultural Hall at 8:15, our total elapsed time being 14 hours 5 minutes, beating the best previous time made during Boston show week by over five hours.

Outside of our gasoline and oil, the expense of our trip amounted to five cents, with which we purchased some extra belt fasteners—more as a matter of precaution than of necessity. Our total consumption of gasoline for the entire 251 miles which the odometer showed we had covered was 25 1-4 gallons, our oil consumed being 2 gallons.

## PLANS FOR THE MICHELIN AMERICAN FACTORY

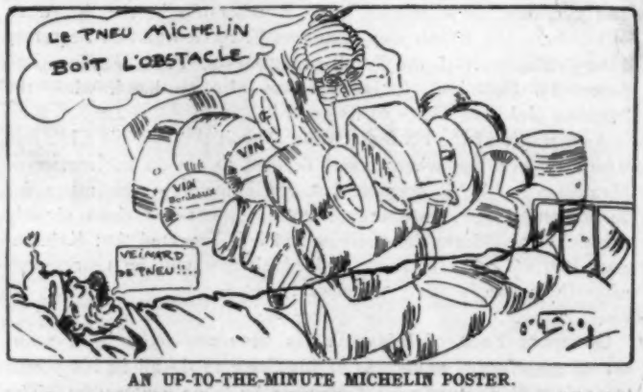
Edouard Michelin, of Paris, who had been in this country for several months past quietly arranging for an American company and factory, has returned to France. It is known that M. Michelin visited several well-known American tire factories and obtained a very comprehensive idea of the tire industry in this country before he completed the plans for an American Michelin plant, which it is understood will be located at Milltown, N. J. M. Michelin gives the following history of the parent company:

"The Michelin factory was erected in 1832 at Clermont Ferrand, France, by the grandfather of André and Edouard Michelin, these two brothers taking over the plant in 1888. In 1891 only fifty-two employes were kept busy, and it was in this year that the Michelin detachable bicycle tire was used by the winner of the first Paris-Brest race. In 1896 the first Michelin automobile tire appeared and now the company employs 4,000 men.

"We are coming to the United States because, notwithstanding the fact that we have to pay an enormous duty, we sell here a large quantity of tires. Our own representatives in this country, E. Lamberjack & Co., last year sold over 16,000 tires and have already contracted for 20,000 tires for this year.

"Some have said that Michelin tires could not be made as well in America as they are in France. I have heard this from several American citizens and confess to have been rather surprised at it. I do not pretend to judge America after the one month I have been here, but I can say, however, that I feel a deep admiration for the United States. I consider that everything here is great and great are the minds of your business men. Everybody seems to go ahead with no fear of danger. Our French and American factories will compete, good-naturedly, and this competition will be very useful to the progress of tires. I am rather at a loss to say which one will overcome the other in popularity, but I think the combination of French ingenuity and American brains will prove a great success."

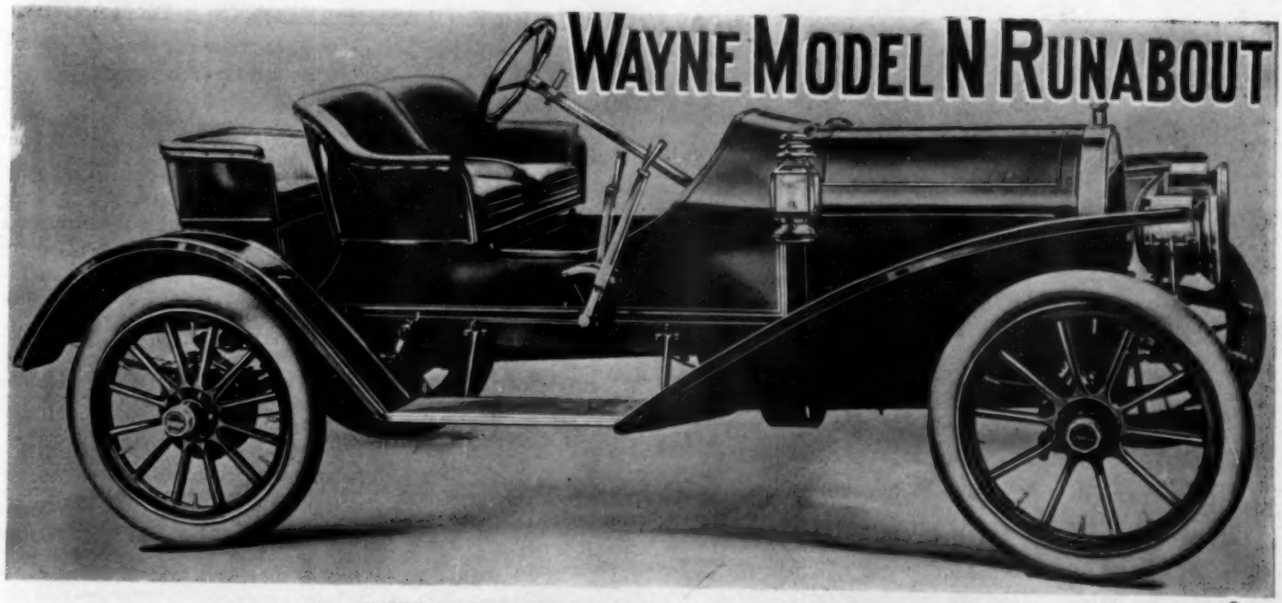
On the Wednesday evening of last week, preceding his sailing the following day on the Touraine, M. Michelin was the guest of honor at a complimentary dinner given to him at the Café des Beaux Arts. Those present included Paul Lacroix, manager of the Renault Frères American branch; George B. Van Cleve, head of the advertising agency of the same name; Leon Rubay, he of the many ignition specialtiës, and S. H. Stern, American manager of E. Lamberjack & Co.




AN UP-TO-THE-MINUTE MICHELIN POSTER.

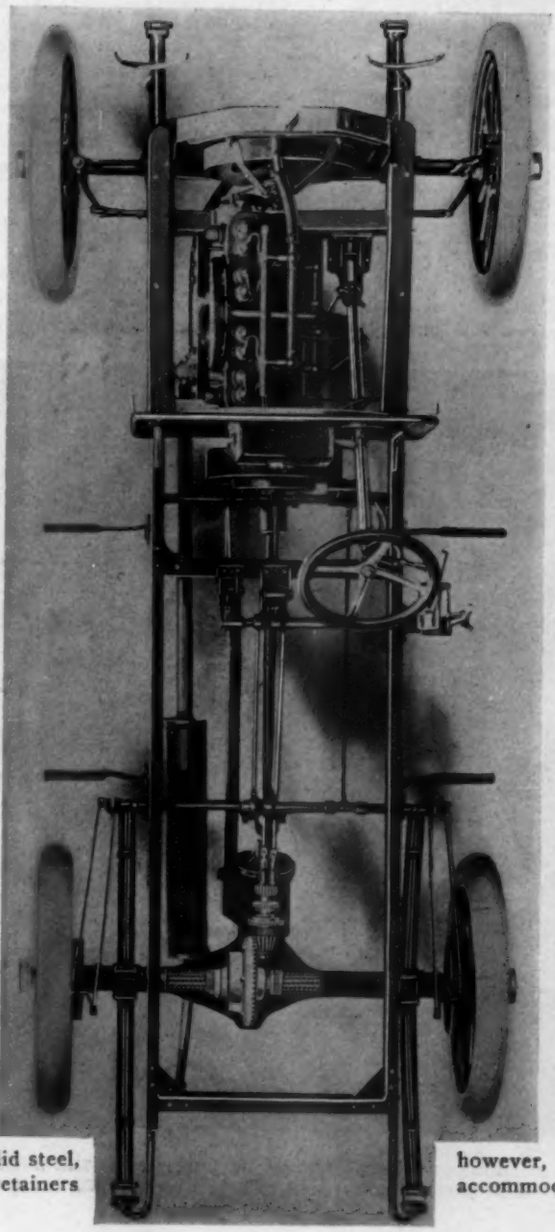
A few years ago Michelin created Bibendum, a giant made of automobile tires, whose quality was that he could drink everything. "Bibendum boit l'obstacle —"Bibendum drinks up the obstacle"—has become a household phrase in France. The exclamation of the drunkard as in his wild dream he watches Bibendum at work on the wine barrels is "Lucky beggar."

# WAYNE MODEL N RUNABOUT

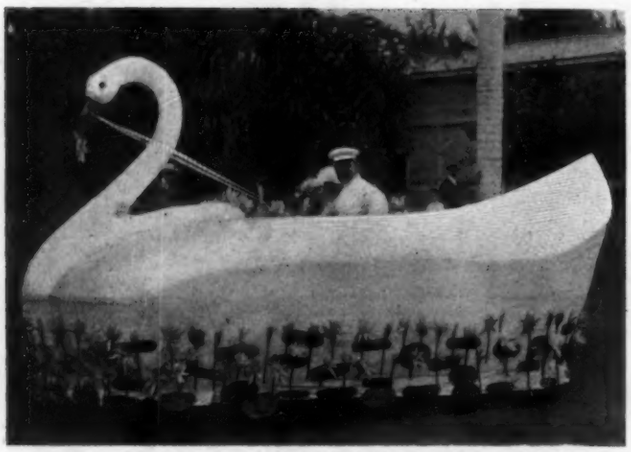


THERE is little doubt that the so-called high-powered runabout is something that is being carried to extremes in a few instances, but the fact that this is the case can do no more to detract from its well-deserved popularity along proper lines than the reckless use of the touring car on the part of a few irresponsible chauffeurs does to the automobile generally. In designing their gentleman's roadster the makers of the Wayne cars have carefully avoided extremes in either direction, and the result is not alone a highly attractive looking car, but one that aptly reflects the purpose for which it is intended. It is equipped with a 30-35-horsepower motor and in general contour follows the lines of the touring Model N, of the same builders, which will be apparent from the photograph of the complete car forming the head of the page.

Stripped of the body, the chassis itself reveals an equally clean-cut appearance, as will be apparent from the accompanying illustration of it. The motor is representative of the most approved trend of current practice in its class. All the valves are placed on the same side and operated from a single camshaft, the valves themselves being made with nickel-steel heads and machine steel stems, electrically welded together, while long, flanged wrought-steel guides are pressed into the openings in the base of the valve ports. The wrist pins are one-inch pieces of solid steel, fastening by tilt screws and wire retainers to the ends of the connecting rods. The latter are of the marine type and are drop forgings of high-grade steel. Throughout the design of the motor the matter of accessibility has been considered paramount, so that every part of it is readily reached for adjustment or repair, without the necessity of tearing down a number of other parts.



The change-speed gear, which is operated by the selective type of gear shifting, provides three speeds forward and reverse and is advantageously located on the rear axle, together with the bevel driving gears and differential, all of which are contained in the same housing. This permits of a style of rear axle construction that lends itself most readily to the requirements of simplicity, coupled with the maximum strength, beside making the gear box accessible to a degree seldom realized where it is placed under the center of the body. Between the clutch and the change-speed gear box there is a shaft slightly over three feet in length, the latter tending materially to reduce the angularity, the entire power plant and transmission mechanism, including the rear axle, being practically in the same horizontal plane under normal conditions, which mean with the customary load, with but a variation of two and one-half degrees as the extreme pitch when the car is empty. The body is of steel and aluminum, and is provided with a third or rumble seat, which, however, is readily detachable to provide accommodation for a trunk, when desired.



H. C. KERR'S ORIENT WINNER IN HONOLULU PARADE.

## A HONOLULU FLORAL PARADE CAR.

Given a Honolulu environment, artistic skill and the expenditure of not a little cash, and the metamorphosis of the automobile is an accomplished fact. In this interesting process the auto has an advantage over the horse vehicles, for the latter, however much they may be buried under flowers and foliage, are obliged to retain their quadrupeds to conserve their mobility. The accompanying illustration depicts H. C. Kerr's Orient buckboard in the Honolulu annual floral parade. No mechanical means of propulsion being visible, the graceful bird looked like a thing of life as it quietly skimmed along in the procession of autos.

## A DECREASE OF SIXTEEN PER CENT.

(From the European Edition of the "Herald.")

A decrease of 16 per cent., as compared with last year, is noted in the exportation of French automobiles during January.

## FREDERICK GLASSUP IMPORTS A BRITANNIA.

The first Britannia automobile to be imported into this country is an 18-24-horsepower four-cylinder touring car and has a number of features worthy of special notice. Among these are: A silent rotary pump of novel design, new automatic carbureter, water piping of extra large size, powerful internal-expansion foot and hand brakes, and circular honeycombed radiator with improved fan. The gear box is of a sliding pattern with three speeds and solid bearings. This car is made by the Britannia Engineering Company, Ltd., of Colchester, Eng., contractors to the British Admiralty, War Office and India Office, and is consigned to Frederick Glassup, the company's sole representative in America.

## STATEMENT BY THE JONES SPEEDOMETER.

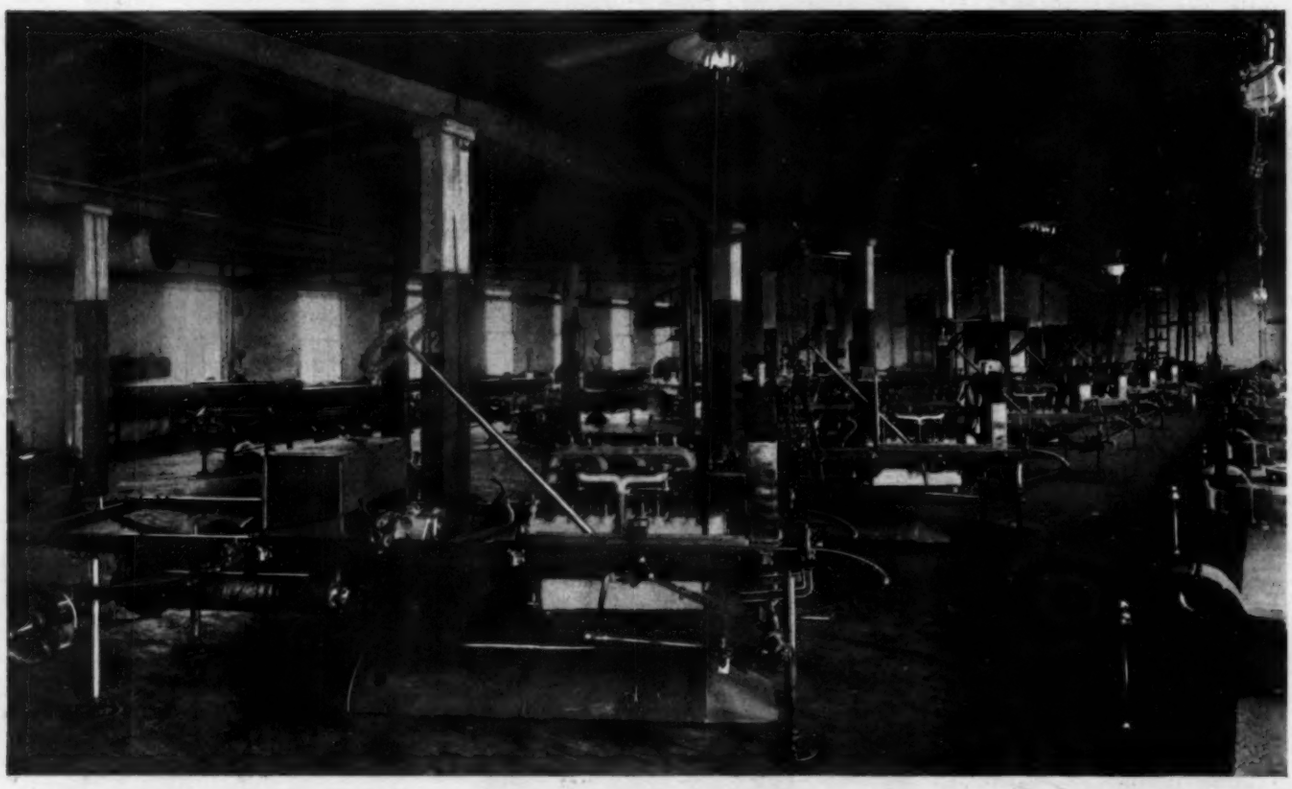
From the Jones Speedometer, 127 West Thirty-second street, New York City, comes the following communication:

**The employees in the toolmaking department of the Jones speedometer factory at New Rochelle, N. Y., went out "on strike" Thursday, March 15. Their places were promptly filled by the Metal Trades Association, of which we are members, and practically all the tools needed for the manufacture of 1907 models have been completed. We desire to inform the public and the trade that there will be no curtailment, interruption, or material delay in our production, and that our customers may positively rely upon the continued prompt shipment of all orders.**

THE JONES SPEEDOMETER,
G. L. Holmes, Manager.

## TO BE AN A. A. A. TOUR CONTESTANT AGAIN.

E. R. Lozier, who participated in the 1906 A. A. A. tour with a 40-horsepower Lozier, again will be a contestant in the A. A. A. event for the Glidden trophy. Preliminary to the national tour, Mr. Lozier and several of his friends are going to have a run between New York and Cleveland, the best performer to be the winner of a special cup intended to settle several discussions which have arisen during the past winter.



IN THE ASSEMBLING ROOM OF THE E. R. THOMAS DETROIT COMPANY, DETROIT, MICH.—THE ASSEMBLING STANDS WERE DESIGNED BY VICE-PRESIDENT H. E. COFFIN.—FOUR CARS PER DAY IS NOW THE REGULAR OUTPUT

# BRIEF ITEMS OF NEWS AND TRADE MISCELLANY

The Reliance motor truck has just been designated as an official baggage truck for the A. A. A. tour for the Glidden and other trophies.

About April 1 the C. G. V. Import Company will remove from their present premises on West Sixty-ninth street to its new showroom at 1849 Broadway

Albert H. Funke, dealer in guns and automobile supplies at 83 Chambers street, New York City, has filed a petition in bankruptcy with liabilities of $102,338 and assets of $51,700.

At the Boston show a woman who called at the Corbin exhibit, said: "I want a car that will always have a home; the last car we bought went out of business and consequently had no home, so it was almost impossible to secure any duplicate parts to make repairs, which was a great disadvantage."

C. W. Kelsey, general manager of the newly-formed American Cab and Express Company, which will shortly inaugurate the taximeter cab system in several large cities, has just returned from Chicago, where he has made satisfactory arrangements for the branch of the company in that city. Mr. Kelsey is satisfied that taximeters will be in public demand as much in Chicago as in New York.

Alexander Winton, Geo. H. Brown and Chas. B. Shanks, of the Winton Motor Carriage Company, are members of a syndicate of Cleveland capitalists who have purchased the twin screw steamship *Eastland*, the fastest craft on fresh water, and will put her in daily passenger service between Cleveland, Cedar Point and Toledo. The *Eastland* is 279 feet over all and has a passenger capacity of 3,400.

Owing to its rapidly increasing business, the Darracq Motor Car Company has found it necessary to utilize their entire building at 1989 Broadway, New York Citv. for showroom purposes and enlargement of office space, necessitating the removal of the repair shop to some other building. A new repair shop has been opened by them, using the entire two-story building at 20 West Sixtieth street for this purpose.

Many American automobile manufacturers are beginning to realize that there is a lucrative field in the export trade. The Maxwell has been successful in creating a foreign demand, and the export business which is in the hands of I. C. Kirkham, of Brooklyn, is rapidly assuming large proportions. In referring to a shipment of 68 Maxwells to the City of Mexico, Mr. Kirkham mentions that all the roads available for automobiling can be traversed in little more than an hour. The question is, "What do they do with the cars?"

Governor Stuart, of Pennsylvania, has attached his signature to the Roberts bill, which, while it attracted little attention, means much to the good roads interests throughout the State and received the quiet support of automobilists. This measure provides that when a township officer refuses or persistently neglects to perform his duties, twenty-five citizens of the township may petition the court for his removal, and if the judge decides that the charges of negligence are proven, he may, after giving the delinquent a chance to be heard in his own defense, depose him and appoint a successor at once.

## NEW AGENCIES ESTABLISHED.

The East Side Auto Station has secured the Pennsylvania gasoline car agency in Providence, R. I.

The Automobile Import Company, 90-96 Stanley street, Montreal, has taken the agency for the Reo for the province of Quebec.

Auto Sales & Livery Company, Providence, R. I., has been appointed Rhode Island agent for the Glide automobiles, with salesrooms at 7 Reservoir avenue.

A branch office has recently been opened by the New York and New Jersey Lubricant Company at 60 Wabash avenue, Chicago. H. C. Watts has been appointed manager.

A new salesroom and garage has been opened by the Jackson Motor Car Company, at 1413 McGee street, Kansas City, Mo., where the interests of Jackson automobiles will be looked after in the Southwest territory.

A. G. Powell, 1519 Spring street, Philadelphia, has acquired the local selling rights for the Chalfont, a 22-25-horsepower, $1,300 car built at Lenover, Chester County, Pa. An agency for the Holsman car, of Chicago, was also established last week by W. S. Williamson at the Crestmont Garage, at Fifteenth and Oxford streets, in the same city.

New agencies established by the Wayne Automobile Co., Detroit, Mich., are as follows: Solliday Motor Car Co., 321 Fourth street, Milwuakee, Wis.; Western Auto Company, Denver, Col.; John S. Watters, 233 Baronne street, New Orleans, La.; M. Francis Kane, 507 Mutual Life Building, Seattle, Wash. The Motor Car Agencies Company has taken over the business of J. W. Leavitt & Company, San Francisco, distributors for the Wayne in Northern California.

A company has been formed by Edw. A. Cassidy, late manager of the publicity department of the American Motor Car Manufacturers' Association, and Jas. G. B. Davy, who has been interested in different lines, both in this country and Europe, to do a general automobile accessory jobbing business throughout the Southern States. This new concern will be known as Cassidy-Davy & Co., and is located in Baltimore. They state that they will carry the largest and most complete stock of automobile accessories south of Philadelphia. Cassidy-Davy & Co. will be the southern sales agents for Ajax tires, Monogram oils and the Leavitt timer and distributer.

## PERSONAL TRADE MENTION.

E. M. McIlvain, formerly president of the Bethlehem Steel Company, has been elected president and general manager of the Robins Conveying Belt Company, Park Row Building, New York.

T. F. Byrne, Chicago branch manager for the Franklin, severs his connection there on April 1. He has purchased an interest in, and becomes manager of the Canadian Automobile Company of Montreal and Quebec, distributers of the Darracq in Canada.

L. A. Harris, for five years in charge of the Elephant Battery & Chemical Company, of London, England, and for the past year their American representative at New York, severed connection with that concern March 7 to engage as salesman with the R. E. Hardy Company.

David W. Henry, general traveling representative of the Electric Vehicle Company, has returned from an extensive cross country trip, the itinerary of which included practically every city of any importance between Hartford and Portland, Ore. Mr. Henry reports business along the west coast as particularly brisk. The San Francisco show, while small, afforded a good example of Western resourcefulness. After a few days in Hartford Mr. Henry will make a tour of Canada, taking in all the principal cities.

## RECENT TRADE PUBLICATIONS.

Supplies are described and illustrated in the catalogue of the Brooklyn Motor Car Company of Bedford avenue, Brooklyn. The line includes everything needed by the automobile or the owner of the automobile.

The Bowers carbureter, constructed by the F. E. Bowers Company, New Haven, Conn., is a departure in several respects from the general type of carbureters and one that will give improved results. Its claims are presented in a brochure just issued by the manufacturers.

A descrintive booklet on the Perfection Spring has been issued by the Perfection Spring Company, 2414-2418 Superior avenue, N. W., Cleveland, O. The particular features of these springs and their advantages over other makes are interestingly put forth in the new publication.

A very pleasing hanging calendar has been issued by the Springfield Metal Body Company, of Springfield, Mass. The headpiece represents a smart touring automobile standing by the roadside with a smiling country scene as a background. The calendar is an artistic production.

Catalogue 7 issued by the Brennan Motor Manufacturing Company of Syracuse, N. Y., deals completely with the various types of motors constructed by this firm. Air and water cooled motors, double opposed and four-cylinder engines, gears, electrical parts, motor boats and their equipments are all described.

The Meteor is the title of an automobile built at the Meteor Automobile Works, Bettendorf, Ia. The machine is a 50-horsepower model, for which quite a number of good points are claimed, among them being a very effective transmission. The new catalogue tells all about it in engaging style.

"The Silent Partner" deals a little with the Globe Machine and Stamping Company's products and a lot about other things. The other things are just as interesting as the stampings and they are not lacking in variety or pithiness. The curious would do well to get "The Silent Partner"

for study. The address of the company is Hamilton avenue, Cleveland.

Automobile crank shafts as constructed by the Standard Connecting Rod Company of Beaver Falls, Penn., are described and illustrated in a small booklet issued by that company. Although only a limited portion of the firm's output can be dealt with in the limited space, there are examples of different crank shafts for all types from single cylinder to eight-cylinder engines.

Very complete details of the Stearns automobile are given in the handsome catalogue just issued by the F. B. Stearns Company, Cleveland, O. Mechanical drawings show every part of the mechanism, and the text further helps to give a thorough understanding of the machine. There is a good chapter on suggestions for adjusting and operating Stearns cars. The book should prove particularly useful to owners and operators of this automobile.

Darracq needs no introduction. The machines manufactured at the famous factory on the banks of the Seine at Paris are described and illustrated in the 1907 catalogue just issued by the Darracq Motor Car Company, 1989 Broadway, New York. Details are given of the new six-cylinder 50-horsepower Darracq which makes its bow to the public this year. Various other models of high- power four-cylinder machines as well as a number of elegant closed and runabout bodies are illustrated.

There is a sense of thoroughness and completeness about the automobile course set forth in the booklet issued by the New York School of Automobile Engineers, 146 West Fifty-sixth street. That there is room for a school of this nature is known to all, and the New York school seems to fill the bill. In their booklet full particulars are given of the different day and evening courses for professional chauffeurs, or would-be professional chauffeurs, and for automobile owners. The home study course, too, is minutely described, and examples given of some of the lesson plates supplied to students. A number of illustrations of the school are included in the publication.

"Crucibles—Their Care and Use," is the title of a handsome little booklet by John A. Walker, general manager of the Joseph Dixon Crucible Company, Jersey City, N. J. The book is intended to instruct users of crucibles as to their proper care. It tells what graphite is and why crucibles are made of it. It tells why crucibles must be made of flake graphite. It tells why some crucibles are dark and others light and the importance of this fact. There is also much valuable allied information on the proportions of metal in commonly used alloys, on freezing, fusing and boiling points of various substances, the specific gravity of various metals and the comparative value of fuels. The double page center of the book carries a most vivid and realistic foundry scene.

## MARTINI IMPORT CO. FORMED.

The Martini Import Company has been organized by Percy S. Palmer, formerly senior member of the firm of Palmer & Christie, Jos. E. Freeman and F. D. Palmer, to take over the agency for the Martini cars, which has been held by the firm of Palmer & Christie. With its enlarged capital and ample facilities the new company promise to make this car one of the most prominent foreign cars handled in this country. Mr. Palmer has left for Switzerland, to confer with the Martini Company in regard to receiving a larger allotment of these cars for the United States. The old home of the Martini car at 239 West Fiftieth street will be retained temporarily as a garage and machine shop until arrangements are made for a larger and more convenient place in a more prominent location. A show room on Broadway will be engaged for temporary use. The officers of the new company are Jos. E. Freeman, president; F. D. Palmer, vice-president; Percy S. Palmer, secretary and treasurer.

## STAMPED STEEL AUTO SPECIALTIES.

Added to the numerous stamped steel specialties designed particularly for automobile use, now being marketed by the Dover Stamping Company, 385 Putnam avenue, Cambridge, Mass., they are call-

ing attention to a new design of oily rag and waste can for garage use, as called for by the requirements of the board of fire underwriters to meet the insurance regulations. Nothing is so liable to spontaneous ignition as a heap of oily waste, so that it is imperative to keep it in a fireproof receptacle. They are made in four sizes and are mounted on steel legs which hold them several inches above the floor. Among the other specialties manufactured by this concern are auto gasoline measures, oil cans, funnels and a full complement of other useful articles of a kindred nature for the use of automobilists.

BUSY SCENE IN THE ASSEMBLING ROOM OF THE FACTORY OF THE DRAGON AUTOMOBILE COMPANY, PHILADELPHIA.